CHAPTER 3
Transportation System Options

Going-to-the-Sun Road will undergo significant rehabilitation in upcoming years to address safety and structural concerns. This rehabilitation is likely to require periodic closures of at least one lane of the Road, with alternating one-way traffic stops. The resulting traffic delays could impact the quality of the visitor experience. To mitigate this impact, Glacier needs to provide as many visitor options as possible. Chapter 2 listed various visitor use improvement options that can be considered during the road rehabilitation process, the benefit of which will be felt long after the Road rehabilitation is complete. This chapter will focus on two other important options: implementation of an effective transit system, and transportation management strategies for the park.

Transit System Options

If a transit system can take just a small percentage of traffic off the Going-to-the-Sun Road (ten to fifteen percent during peak hours) the Road will realize a significant reduction in congestion. However, providing a visitor-friendly transit system will be expensive. In fact, some will question whether providing such a system is a proper use of funds. Almost all transit systems, even those in large cities, do not pay for themselves with the fares they collect. The transit system will have to be financially subsidized. Despite this fact, a transit system in the park would make good sense for the following reasons:

- Congestion on the Road during peak periods is becoming more prevalent as time goes on. Although recent park visitor forecasts predict flat visitation rates for the coming years (see Appendix G for a complete discussion of visitor forecasts), the national trend is toward a reduction in the number of people per vehicle. This will create more traffic on the Road even with flat visitor rates.

- Parking at certain key visitor experience sites on the Road is at or over capacity. If nothing is done, Park resources will have to be directed toward managing con-

gested parking lots and illegal parking instead of resource management or visitor services.

- The timing of the implementation of a transit system fits well with the pending rehabilitation of the Road. The transit system can be used as a tool to manage traffic on the road while rehabilitation work is underway, perhaps conditioning visitors to use it more after the rehabilitation is complete. Further, federal funding for the capital costs of a transit system can be requested as a part of construction mitigation.

- A need exists to provide an efficient method of access to the park by means other than the private auto. For example, many hiking trails in the park connect one area of the park to another, leaving hikers with the dilemma of how to get back to their cars once they have finished their hike. A transit system could efficiently fill this missing link in the hiker's itinerary and relieve parking demand at certain critical trailheads.

- The park has been designated a biosphere reserve under the Man and Biosphere Programme of the United Nations Education, Scientific and Cultural Organization (UNESCO). With this designation comes the underlying duty to preserve and safeguard the diversity and integrity of biotic communities. Reducing the number of automobiles, and therefore the amount of pollution in the park, fits well within this mandate.

Overview of Transit Options

Three initial transit options for Going-to-the-Sun Road are summarized. It is envisioned that one of these three options will be implemented in conjunction with the Road rehabilitation project. Other transit system elements which complement the three main options, providing additional transit options on a park-wide basis, are described later in this chapter.

Option A – Existing Shuttle Service. This option represents the existing shuttle bus system currently operated by Glacier Park, Inc. (GPI). The existing service can best be described as a two-loop system with headways (i.e. the time between buses along a route) of between two hours and five and one-half hours. The eastbound loop travels from the West Glacier area or Lake McDonald Lodge to Logan Pass three times a day. The westbound loop travels from Many Glacier Lodge or St. Mary to Logan Pass three times a day.

Option B – Improved Shuttle Service. This alternative is designed to provide an improvement over the existing shuttle system. Transit vehicles would leave the west side and east side of the Road every 60 minutes.

Option C – Aggressive Shuttle Service. This alternative is designed to provide a significant improvement over the existing shuttle system. Routes would be the same as Option B, but service would be increased to provide 30-minute headways.

To address the concerns of reduced roadway capacity during rehabilitation and adequate park access for hikers, Glacier might consider a combination of the options. Table 9 compares the characteristics of the three transit system options:

Table 9: Comparison of Transit Options

System Characteristic	Option A Existing Service	Option B Improved Service	Option C Aggressive Service
Route Duration (One way, includes stops)	6 hrs, 25 min.*	2 hrs, 40 min	2 hrs, 40 min.
Days of Operation	July 1 – Labor Day	July 1 – Labor Day	July 1 – Labor Day
Headways	2 to 5.5 hrs**	60 minutes	30 minutes
Scheduled Stops (West to East)	• West Glacier • Apgar Village • Lake McDonald Lodge • Avalanche • The Loop • Logan Pass • Siyeh Bend • Jackson Glacier Overlook • Sun Point • Rising Sun • St. Mary V.C. • Many Glacier • Swift Current	• West Glacier • Apgar Village • Lake McDonald Lodge • Avalanche • McDonald Creek • The Loop • Logan Pass • Siyeh Bend • Jackson Glacier Overlook • Sun Point • Sunrift Gorge • Rising Sun • St. Mary V.C.	• West Glacier • Apgar Village • Lake McDonald Lodge • Avalanche • McDonald Creek • The Loop • Big Bend • Logan Pass • Siyeh Bend • Jackson Glacier Overlook • Sunrift Gorge • Sun Point • Wild Goose Island Overlook • Rising Sun • St. Mary V.C. •

Table 9: Comparison of Transit Options (Continued)

System Characteristic	Option A Existing Service	Option B Improved Service	Option C Aggressive Service
Daily Round Trips	3	13	25
Number of Vehicles	3	7	14
Vehicle Type	12-passenger vans	15-passenger vans or 25-passenger bus	15-passenger vans or 25-passenger bus
Capital Costs	$90,000	$210,000 (van) or $542,500 (bus)	$420,000 (van) or $1,085,000 (bus)
Annual Operation and Maintenance Costs ***	$48,000 - $69,000	$156,400 to $231,600 (van) $179,900 to $255,100 (bus)	$303,000 to $447,400 (van) $350,000 to $494,000 (bus)
Ridership****	+/- 20/day, or 1,320/year	100 to 125/day, or 6,600 to 8,250/yr.	200 to 250/day, or 13,200 to 16,500/yr*

* Based on 2001 schedule which includes layover time of one hour and 50 minutes at Logan Pass.

** The existing shuttle system has three departures per day from most stops. Some departures are two hours apart; others are five and one-half hours apart.

*** Operation and Maintenance (O&M) costs include labor, fringe benefits, maintenance, fuel/oil/lubricants, maintenance supplies, utilities, vehicle insurance, and capital replacement. Capital replacement assumes a vehicle lifespan and replacement costs as described later in the Capital Costs section of this chapter.

**** Ridership is the number of riders projected on the system with early action Transportation Demand Management (TDM) strategies in place. For a discussion and explanation of the TDM strategies, see the section of this chapter entitled *Transportation Management Strategies*.

Service Characteristics and Costs

Route End Points. During the Road rehabilitation period, an improved transit system (Option B or C) should be considered for Going-to-the-Sun Road between West Glacier and the St. Mary Visitor Center. Although the west end of this route is West Glacier, a visitor staging area could be considered in the Apgar Village area, possibly in conjunction with the new west side Discovery Center. By locating transit staging at this location, visitors are provided the opportunity to understand the park by visiting the Discovery Center, and are exposed to information on alternative forms of travel such as transit. Having these functions at a single location provides visitors an easier transition to transit.

Route Length and Running Time. The length of the route from West Glacier to St. Mary is approximately 50 miles. Assuming an average operating speed along the route of plus or minus 20 mph (includes stops), the one-way running time of the route is approximately two hours and 40 minutes.

Days and Hours of Operation. Options B and C are assumed to provide service seven days a week from 7:00 a.m. (departing) to 9:40 p.m. (arriving) between July 1 and Labor Day (to be adjusted once in operation based on actual experience). If the existing shuttle operated by GPI continues to provide the shuttle service (Option A), service will continue to be provided seven days a week operating between 7:30 a.m. and 8:00 p.m., July 1 to Labor Day.

Schedule and Stop Locations. Schedules for Options B and C are presented in Table 10, and are based on proposed headways and an average one-way running time of two hours and 40 minutes. Vehicles operating on the route will make scheduled stops for passenger pick-up and drop-off at the locations shown in Figure 26. Scheduled stop times at each of these stops should be determined after the route is field-tested, but before revenue service begins. In order to provide the best level of visitor service, shuttle vehicles should provide on-demand hiker pick-up and/or drop-off at trailheads.

Note: The transit schedules shown in Table 10 are one example of how service could be provided. Because of the odd number of runs in the schedules presented, the last driver of the day would have to return over the length of the Road with an empty shuttle. This schedule and the associated costs for labor and equipment will be revised, however, as the Park Service and concessioner continue to develop and refine the transit program in response to actual ridership and operating conditions.

Table 10: Proposed Transit Schedules

Option B: West Glacier to St. Mary

Departs West Glacier	Arrives Logan Pass	Arrives St. Mary
7:00am	8:45am	9:40am
8:00am	9:45am	10:40am
9:00am	10:45am	11:40am
10:00am	11:45am	12:40pm
11.00am	12:45pm	1:40pm
12:00pm	1:45pm	2:40pm
1:00pm	2:45pm	3:40pm
2:00pm	3:45pm	4:40pm
3:00pm	4:45pm	5:40pm
4:00pm	5:45pm	6:40pm
5:00pm	6:45pm	7:40pm
6:00pm	7:45pm	8:40pm
7:00pm	8:45pm	9:40pm

Option B: St. Mary to West Glacier

Departs St. Mary	Arrives Logan Pass	Arrives West Glacier
7:00am	8:00am	9:40am
8:00am	9:00am	10:40am
9:00am	10:00am	11:40am
10:00am	11:00am	12:40pm
11:00am	12:00pm	1:40pm
12:00pm	1:00pm	2:40pm
1:00pm	2:00pm	3:40pm
2:00pm	3:00pm	4:40pm
3:00pm	4:00pm	5:40pm
4:00pm	5:00pm	6:40pm
5:00pm	6:00pm	7:40pm
6:00pm	7:00pm	8:40pm
7:00pm	8:00pm	9:40pm

Table 10: Proposed Transit Schedules (Continued)

Option C: West Glacier to St. Mary

Departs West Glacier	Arrives Logan Pass	Arrives St. Mary
7:00am	8:45am	9:40am
7:30am	9:15am	10:10am
8:00am	9:45am	10:40am
8:30am	10:15am	11:10pm
9:00am	10:45am	11:40am
9:30am	11:15am	12:10pm
10:00am	11:45am	12:40pm
10:30am	12:15pm	1:10pm
11.00am	12:45pm	1:40pm
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4:00pm	5:45pm	6:40pm
4:30pm	6:15pm	7:10pm
5:00pm	6:45pm	7:40pm
5:30pm	6:15pm	8:10pm
6:00pm	7:45pm	8:40pm
6:30pm	8:15pm	9:10pm
7:00pm	8:45pm	9:40pm

Option C: St. Mary to West Glacier

Departs St. Mary	Arrives Logan Pass	Arrives West Glacier
7:00am	8:00am	9:40am
7:30am	8:30am	10:10pm
8:00am	9:00am	10:40am
8:30am	9:30am	11:10pm
9:00am	10:00am	11:40am
9:30am	10:30am	12:10pm
10:00am	11:00am	12:40pm
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4:30pm	5:30pm	6:10pm
5:00pm	6:00pm	7:40pm
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6:30pm	7:30pm	9:10pm
7:00pm	8:00pm	9:40pm

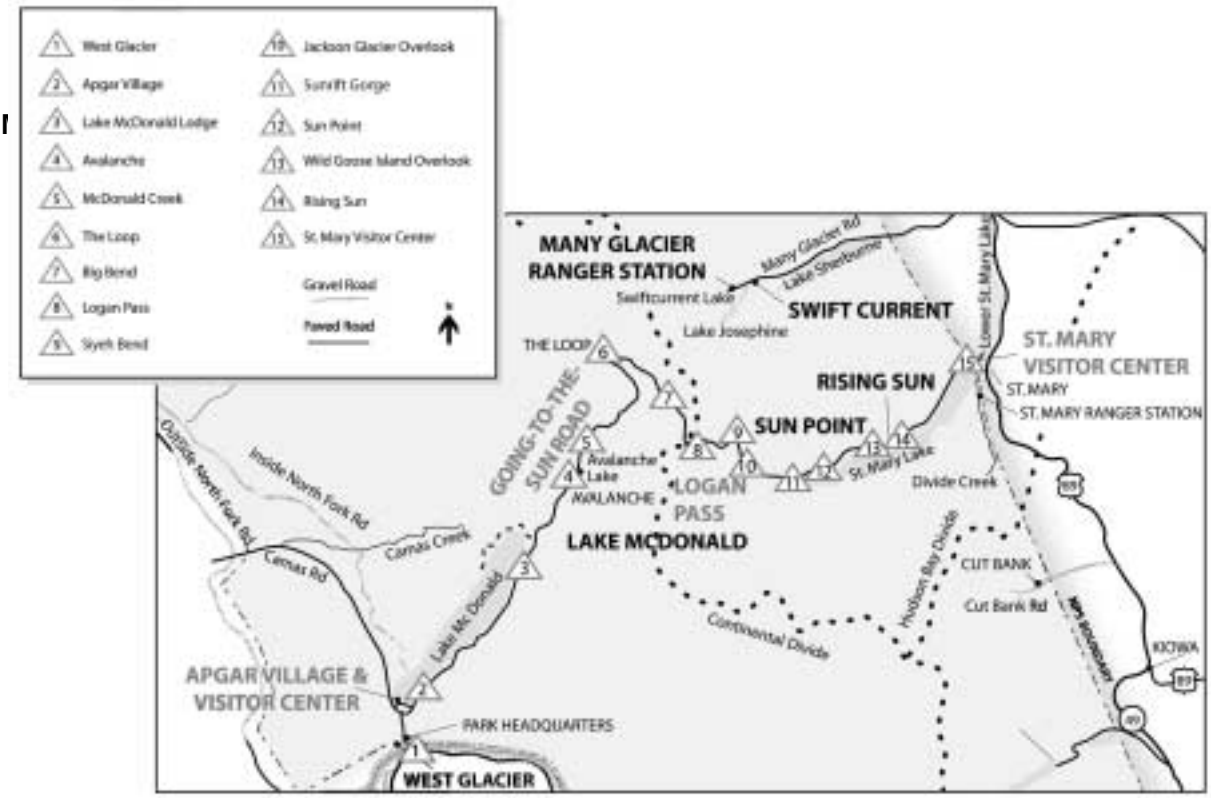

Figure 26: Proposed Transit Stops

Number of Vehicles Required. A total of four vehicles (including one back-up) are required for Option A. A total of seven vehicles (including one back-up) are required under Option B to maintain hourly headways in both directions. Option C necessitates using fourteen vehicles (including two back-ups) to maintain 30-minute headways in both directions.

Daily/Annual Service Characteristics

- ***Option A*** generates approximately 306 miles (six runs over routes that vary from 34 to 61 miles in length) and 21 vehicle hours of service each day. On an annual basis (seasonal – approximately 66 operating days between July 1 and Labor Day), this would result in 20,196 vehicle miles and 1,386 vehicle hours of service.

- ***Option B*** will generate approximately 1,300 vehicle miles of service (26 runs over a route length of 50 miles) and 76 vehicle hours of service each day. On an annual (seasonal – approximately 66 operating days between July 1 and Labor Day), this would result in 85,800 vehicle miles and 5,016 vehicle hours of service.

- ***Option C*** will generate approximately 2,500 vehicle miles of service (50 runs over a route length of 50 miles) and 146 vehicle hours of service each day. On an annual basis (seasonal – approximately 66 operating days between July 1 and Labor Day), this would result in 165,000 vehicle miles and 9,636 vehicle hours of service.

It should be noted that depot deadhead hours and miles (the hours/miles vehicles operate between the starting/ending location and where they begin or end service) are not included in the above totals.

Operating Costs. Systems of this size and type (fixed route service, small vehicles, limited number of vehicles) typically have operating costs that range between $25 and $40 an hour. These operating costs include labor, fringe benefits, vehicle maintenance, fuel/oil/lubricants, maintenance supplies, utilities, and vehicle insurance. Based on these hourly costs, annual operating costs for each option would be as follows (capital replacement costs are not included here but are discussed separately in a later section):

- ***Option A:*** $34,500 to $55,500 per year
- ***Option B:*** $125,400 to $200,600 per year
- ***Option C:*** $241,000 to $385,400 per year

These operating costs are calculated in 2001 dollars and can be expected to increase between 3.5 percent and four percent per year.

Vehicle Type. Given the current level of demand (20 passengers per day), the fifteen-passenger vans currently used by GPI to provide service would appear to be a sufficient vehicle type to provide the new shuttle service. However, the National Park Service could look to purchase small shuttle buses, in the 21 to 25-foot range (a waiver from the National Park Service would have to be obtained if a vehicle over 21 feet was selected to provide service on Going-to-the-Sun Road), rather than use the smaller type vans. These types of buses, which typically hold between 20 and 25 persons, provide a smoother ride, easier access, and much better viewing potential for passengers than do the smaller vans. They are also more durable and easier for

drivers to maneuver. The park will have to determine whether or not to use vehicles which allow passengers to stand since tradeoffs exist between the comfort of all passengers when several are standing and the convenience of not having to wait for the next bus.

The more passenger enhancements the vehicle provides, the higher ridership is expected to be. If a signature vehicle (i.e. something akin to the historic red buses) were used, ridership might be significantly higher.

Alternative fuel vehicles such as Compressed Natural Gas (CNG), Liquid Natural Gas (LNG), and methanol, could possibly benefit the surrounding environment as they provide a reduction in nitrous oxide (NOx). Disadvantages of using alternative fuel vehicles include:

- They require specialized fueling facilities and maintenance garage modifications that generate high capital costs.

- They are less energy efficient and have higher vehicle maintenance costs than diesel buses.

- Because the primary effect of NOx on air quality is its contribution to ozone formation, NOx reductions have the most meaningful benefit in ozone non-attainment areas. In areas that are in attainment of ozone standards, such as Glacier National Park, the benefits of alternative fuels are not as great.[1]

However, because many of the underlying principles and policies of the GMP for Glacier are augmented by alternative fuel technology, the park should look seriously at providing alternative fuel vehicles for at least part, if not all, of its transit fleet requirements. The historic red buses, which may soon be restored for use on tour excursions, will, if restored, be equipped with an alternative fuel system that uses both gasoline and natural gas. Glacier will be conducting a comprehensive alternative fuels study in 2002. The park should coordinate its alternative fuel study and program with regional transit providers who may also be considering alternative fuel vehicles. Such coordination might provide an opportunity for cost sharing on infrastructure items.

1. *TCRP Report 38 – Guidebook for Evaluating, Selecting, and Implementing Fuel Choices for Transit Bus Operations*. Transportation Research Record. National Research Council. 1998.

Capital Costs. Tables 11 and 12 compare the costs of the types of vehicles that should be considered for service on the shuttle route. These estimated costs are presented to compare the cost differences of different types of vehicles over time, not to give estimates of the cost to operate and maintain different types of smaller vehicles.

It should also be noted that regardless of which vehicle is selected, each vehicle should be ADA lift-equipped and include amenities such as passenger-accessible luggage racks, air conditioning, large non-tinted windows, bike racks, Global Positioning System (GPS) units for tracking vehicle movement, radios for communication with dispatch, etc. The 1999 purchase costs shown on the table below include each of these specifications in their totals. Alternatively, the transit vehicle fleet could be supplemented with an exclusive ADA vehicle to provide on-demand accommodation for physically challenged individuals on demand.

The cost of replacing the transit fleet over time must be included in the annual operating budget for the system. For purposes of comparison below, the fifteen-passenger gasoline van (first row) and the 25-passenger, front engine, small diesel bus (fifth row) will be used.

Table 11: Cost Analysis[2]

Vehicle Class	Purchase Cost (1999)	Life Expectancy (years) *	Total Equivalent Annual Cost (EAC) **	Percent EAC Difference	Estimated O&M Cost (1999)
Van, Gasoline	$30,000	4	$4,429	0.0%	$2,515
Single Wheel Van Cutaway, Gasoline	$36,000	4	$5,471	23.5%	$3,122
Dual Wheel Van Cutaway, Gasoline	$42,000	5	$6,553	48b.0%	$4,219
Dual Wheel Van Cutaway, Diesel	$48,000	5	$5,344	20.6%	$2,793
Purpose Built, Front Engine, Small Bus, Diesel	$77,500	6	$7,790	75.9%	$4,115
Purpose Built, Rear Engine, Small Bus, Diesel	$120,000	7	$9,464	113.7%	$4,497

* Life expectancy of vehicles takes several variables into consideration, including cost of maintenance, warranty provisions, type of terrain along the route, hours of operation, and miles of service.

** EAC is determined based on the life expectancy of the vehicle, annual inflation, and projected revenue obtained from selling the vehicles to be replaced.

[2] *TCRP Report 61 – Analyzing the Costs of Operating Small Vehicles.* Transportation Research Board. National Research Council. 2000.

Table 12: Total Vehicle Capital Costs

	Option B	Option C
Number of Vehicles Required	7	14
Total Costs (2000 dollars):		
• Van, Gasoline	$210,000	$420,000
• Single Wheel Van Cutaway, Gasoline	$252,000	$504,000
• Dual Wheel Van Cutaway, Gasoline	$294,000	$588,000
• Dual Wheel Van Cutaway, Diesel	$336,000	$672,000
• Purpose Built, Front Engine, Small Bus, Diesel	$542,500	$1,085,000
• Purpose Built, Rear Engine, • Small Bus, Diesel	$840,000	$1,680,000

The up-front capital costs and the capital replacement costs for the three transit options are as follows:

- Option A: Four 15-passenger vans
  - Initial Capital Cost: $120,000
  - Replacement Cost:.....$ 17,700/year

- Option B: Seven 15-passenger vans
  - Initial Capital Cost:.....$210,000
  - Replacement Cost:.....$ 31,000/year
  - Seven 25-passenger buses
  - Initial Capital Cost:.....$542,500
  - Replacement Cost:.....$ 54,500/year

- Option C: Fourteen 15-passenger vans
  - Initial Capital Cost:.....$420,000
  - Replacement Cost:.....$ 62,000/year
  - Fourteen 25-passenger buses
  - Initial Capital Cost:.....$1,085,000
  - Replacement Cost:.....109,000/year

Total Transit System Expenditures: Table 13 illustrates the total system expenditures for each option presented:

Table 13: Total Transit System Expenditures

	Option A	Option B	Option C
Initial Year Expenditures (initial capital costs + annual operating costs + annual capital replacement costs) 2001 dollars	$172,200 - $193,200	15-passenger vans: $366,400 - $441,600 25-passenger buses: 772,400 - $797,600	15-passenger vans: $723,000 - $867,400 25-passenger buses: $1,435,000 -$1,579,400
Ongoing Yearly Costs (annual operating costs + annual capital replacement costs) 2001 dollars	$52,500 - $73,200	15-passenger vans: $156,400 - $231,600 25-passenger buses: $179,900 - $255,100	15-passenger vans: $303,000 - $447,400 25-passenger buses: $350,000 - $494,400

Ridership and Fares

Projected Ridership. Typically when headways are increased, ridership can be expected to grow (e.g. a doubling of existing headways can result in ridership increases that range between 25 and 50 percent). However, since the proposed routes serve a recreational area rather than a typical urban, suburban, or even rural setting, it is difficult to state what percentage increase in ridership can be expected. The proposed shuttle service will serve a captive market (tourists or vacationers arriving specifically to see the park) over a road that is the primary attraction for the majority of visitors.

The current transit system (Option A) has carried between 20 and 100 riders per day over the past ten years. This amounts to an average yearly ridership of about 4,000 riders. Demand for the hiker shuttle is typically high in the early morning as visitors begin their hikes, but low demand prevails the rest of the day. Under Option B, headways will more than quadruple and ridership should therefore increase by 50 to 100 percent to approximately 6,000 to 8,000 per year. Later in this study an aggressive, incremental Transportation Demand Management (TDM)strategy is described. This strategy includes incentives, disincentives, and other supporting measures. This TDM program, coupled with the fact that park visitors may have less opportunity to experience the alpine sections of the Road during the rehabilitation project, will undoubtedly generate increased ridership on the transit system. With the initial levels proposed for the TDM program, it is projected that transit demand can be increased by another five to twelve percent. These TDM-influenced ridership increases are based on studies conducted in other resort/vacation areas where TDM measures such as those contemplated in this study have been put into place. Factoring this

additional demand into the equation, it is safe to say that ridership should grow to between 6,600 and 8,250 passengers per year, or 100 to 125 passengers per day for Option B. Under Option C, ridership should conservatively reach 13,200 to 16,500 passengers per year, or 200 to 250 passengers per day.

The Visitor Survey conducted within the park in 2000 gives some insight regarding the increased ridership potential of the transit system under the higher levels of the TDM strategy (outlined in the section of this chapter entitled *Transportation Management Strategies*). According to the survey, 33 percent of those responding said that if road construction or road congestion limited traffic on the Going-to-the-Sun Road, they would be willing to ride transit if the system were free. Given that the average number of daily visitors to the park over the past three years (1998 to 2000) was 9,619, shuttle ridership would rise to 3,174 daily riders and 209,484 annual riders. **Note:** Transit system facilities would need to be expanded under a fully implemented TDM program. Headways would need to be reduced to every ten minutes between 7:00 a.m. and 7:00 p.m.; the vehicles used would have to accommodate 25 passengers instead of fifteen; and the total number of vehicles would need to be increased to 42. The service plan would generate 7,884 vehicle miles and approximately 440 vehicles hours of service each day. Over the annual season, this would result in 452,334 vehicle miles and 28,512 vehicle hours of service. Based on these figures, annual operating costs would expand to between $712,800 and $1,140,480. Finally, vehicle storage lots would need to be increased to accommodate 21 small buses.

Fares and Subsidies. Glacier Park, Inc. currently charges passengers utilizing their shuttle (Option A) between $8.00 and $16.00, depending on where they are picked up and dropped off on the route. This current range of fares is, however, too low to cover the projected operating costs (upper end of the range) for Options B and C. When one divides the projected operating cost by the projected ridership (upper end of the range) for the proposed service for Options B and C, average fares of $27 (for Option B) and $26 (for Option C) would have to be charged to cover operating expenses. These average fares are extremely high and it is unlikely that visitors would be enticed to use transit instead of private vehicles, which is one of the goals of the proposed service.

A more appropriate fare structure, one that would encourage transit use, would be for the park to charge a non-distance based fare of $2.00 for Option B and $4.00 for Option C to anyone boarding the vehicle. A nominal use fee attached to any vehicle entering the park could then cover the remaining difference between fare revenue and operating expenses for each option.

For Option B, a $2.00 fare multiplied by the projected number of annual riders (8,250 – upper end of the range) would generate $16,500 in fare revenue.

For Option C, a $4.00 fare multiplied by the projected number of annual riders (16,500 – upper end of the range) would generate $66,000 in fare revenue

Table 14 illustrates the amount of subsidy required for each alternative and the surcharge per visitor vehicle required to cover the subsidy:

Table 14: Required Transit Subsidies with Transit Fee

	Option B	Option C
Subsidy required (annual expenditures minus annual fares)	15-passenger vans: $140,000 - $215,000 25-passenger buses: $163,400 - $239,000	15-passenger vans: $233m7,000 - $381,000 25-passenger buses: $284,000 - $428,000
Transit surcharge ($ per visitor vehicle entering park) based on 116,628* visitor vehicles per year (2000)	15-passenger vans: $1.20 - $1.84 25-passenger buses: $1.40 - $2.05	15-passenger vans: $2.03 - $3.27 25-passenger buses: $2.44 - $3.67

* Total number of weekly and annual passes sold at Glacier in 2000.

Alternatively, if the Park Service wanted to give visitors a greater incentive to use transit, they could make the shuttle service free, and cover the entire cost of the transit system by attaching a slightly larger surcharge to the vehicle entrance fee shown in Table 15:

Table 15: Required Transit Subsidies with Free Transit

	Option B	Option C
Subsidy Required (Annual Expenditures)	15-passenger vans: $156,400 - $231,600 25-passenger buses: $179,900 - $255,100	15-passenger vans: $303,000 - $447,400 25-passenger buses: $350,000 - $494,400
Transit Surcharge ($ per visitor vehicle entering park) based on 116,628* visitor vehicles per year (2000)	15-passenger vans: $1.34 - $1.99 25-passenger buses: $1.54 - $2.19	15-passenger vans: $2.60 - $3.84 25-passenger buses: $3.00 - $4.24

* Total number of weekly and annual passes sold at Glacier in 2000.

To summarize, a transit user fee of between $2.00 and $4.00 could be charged in conjunction with an entry fee surcharge of between $1.20 and $3.67 to cover annual expenditures for a transit system. Or, the transit system could be made available for no user charge provided that an entry fee surcharge of between $1.34 and $4.24 is assessed to each visitor vehicle entering the park. These surcharges do not cover the one-time capital costs required to purchase the initial fleet of buses or the costs necessary to provide appropriate infrastructure such as transit stations, bus stops, and parking.

It should be noted that if the park elects to collect fares, each transit vehicle would have to be equipped with a non-registering fare box that is capable of collecting coins and currency. It is also recommended that visitors be allowed to pre-pay for fares (as is currently allowed by GPI) at hotels, visitor centers, and the proposed west side Discovery Center.

Transit Operations

Service Administration. The NPS can either provide the proposed shuttle service, or contract with a private operator. The existing shuttle service on the Road is contracted to GPI.

It is recommended that the NPS contract the service to a private operator for the following reasons:

- There are experienced operators who already provide transportation in the park.
- Contracted service generally costs $5 to $10 an hour less.
- A significant amount of administrative expense would be generated by establishing the NPS' own transportation operation.

The NPS transit service contract should clearly spell out the service parameters, as well as specific contracting responsibilities. An example of how these contracting responsibilities would be spelled out is presented in Table 16:

Table 16: Contracting Responsibilities

Category/Name	Activity	Provider
Grant Administration	Grant Preparation	NPS
	Grant Management	NPS
Reporting	Procedures	Service Provider
	Data Collection	Service Provider
	Data Analysis	Service Provider
	Service Monitoring	NPS
Procurement	Specifications Development	NPS
	Production Inspection	Service Provider
	Inspection and Acceptance	Service Provider/ NPS
Planning	Route and Schedule Evaluation	NPS /Service Provider
Marketing	Campaigns and Promotions	NPS
Maintenance	Vehicle Cleaning	Service Provider
	Major Repair Work	Service Provider
	Routine Maintenance	Service Provider
Operations	Employee Recruitment	Service Provider
	Employee (contract) Management	Service Provider
	Employee Training	Service Provider/ NPS
	Vehicle Operations	Service Provider
	Safety Training	Service Provider

Under the contract arrangement, the NPS (the Superintendent and Concessions Management Department) would be responsible for setting transportation policy in the park, administering possible grant opportunities, marketing and promoting the service, and overseeing the private operator's overall operation. However, they would not be responsible for the day-to-day operation of the service, or vehicle maintenance.

As for the vehicles' ownership, the NPS could elect to own the vehicles themselves and lease them back to the private operator at a nominal rate such as $1.00 a year per vehicle, or have the private operator be responsible for owning and acquiring the necessary vehicles.

Personnel. The shuttle service detailed above would require staff in the following positions:

- ***Transit Manager.*** One transit manager would be in charge of day-to-day activities and responsible for all administrative and operational procedures. The transit manager's hours would be from 8:30 a.m. to 5:30 p.m.

- ***Operations Clerk.*** Two operations clerks would supervises operations, scheduling, dispatching, and data entry. One clerk would work a shift from 6:00 a.m. to 3:00 p.m., while the second clerk would work a shift from 1:00 p.m. to 10:00 p.m.

- ***Clerical.*** One clerical staff person would be responsible for scheduling, dispatching, data entry, and reception. The clerical staff person's hours would be from 8:30 a.m. to 5:30 p.m.

- ***Drivers.*** Drivers would be responsible for safely transporting all passengers to and from their destinations.

For Option B, a total of twelve drivers would be needed on each shift. For Option C, 24 drivers would be needed. The length of driver shifts would vary from six to nine hours; therefore, shifts should be rotated on a weekly basis to balance out each driver's total work hours, and to avoid driver fatigue. These schedules allow drivers starting the morning runs to arrive approximately one hour before the start of their runs to perform a pre-trip inspection and vehicle cleaning. These schedules also allow all drivers one or two 20-minute layovers during their runs and 20 minutes of free time after their runs are over.

Training. The operator of the service should ensure that all drivers are trained when they are initially hired and then periodically retrained in seven basic skill areas:

- ***General driving skills.*** The ability to maneuver a vehicle under varying conditions.
- ***Accident avoidance techniques.*** Defensive driving.
- ***Passenger assistance skills.*** Helping passengers to reach, board, and leave a vehicle with special regard to individual needs.

- ***Emergency first-aid skills.*** Administering first aid in emergency situations prior to the arrival of medical assistance.
- ***Non-medical emergencies.*** Understanding safety and standard operating procedures with regard to vehicle breakdowns or other major service delays.
- ***Basic transportation operation skills.*** Being knowledgeable about basic organizational operating procedures and service measurements, as well as specific area regulations and the purposes of these regulations.
- ***Interpretive skills.*** The shuttle system is also an ideal tool for added interpretive opportunities in the park. Training the shuttle drivers to provide "rolling tours" of the park as the shuttle proceeds along Going-to-the-Sun Road would heighten the quality of the transit experience and increase ridership. Drivers should also be sufficiently trained to answer questions on area resources and the cultural and historical aspects of the park.

In addition, all drivers must possess a Chauffeur's or Commercial Driver's License as required by the State of Montana.

Vehicle Maintenance, Fueling, and Storage. Given the substantial cost of building a dedicated vehicle maintenance facility for the proposed service, vehicle maintenance and fueling should be performed at local garages and service stations. Some type of contractual arrangement for these services could reduce costs.

The operator of the system should, however, perform daily vehicle servicing and pretrip inspection. Preventive maintenance (PM) inspections should be monitored using computer software, which tracks the current odometer reading, the odometer reading at last PM, the odometer reading when the next PM is due, and the miles until the next PM for each vehicle in the fleet. A typical interval between scheduled PM is 5,000 miles.

Drivers must report any safety defects to the transit operations clerk. Also, the driver must sweep the vehicle, dust the dash and seats, and remove all litter from the vehicle on a daily basis. Vehicles should be cleaned more thoroughly on a periodic basis.

Regardless of whether the NPS provides transportation directly or contracts service to a private operator, vehicles should be stored at covered and fenced-in parking lots at or near West Glacier and St. Mary, as these are the two locations where vehicles begin service. The size of each lot would depend on whether Option B or C is selected. For Option B, spaces to accommodate four vehicles at each location would

be required. For Option C, spaces to accommodate seven vehicles would be required.

Service Evaluation. In order for the NPS to evaluate the performance of its transportation program on a monthly and annual basis, a performance monitoring system with a set of evaluation measures and related standards needs to be established. A sample performance monitoring system for the proposed service is shown below. In designing transit contracts, the NPS should preserve rights of recourse for addressing performance levels.

The performance monitoring system is designed to quantitatively address both service effectiveness and cost efficiency.

A set of performance indicators has been identified. The selection of these measures was based on relevance to the proposed service, availability of data, and general use within the industry. The latter facilitates comparison of the proposed service to industry standards.

The six performance measures in the two categories that were developed for the monitoring system are presented below, along with a set of specific standards set as yardsticks against which the proposed service can be gauged. The standards are designed to be within reasonable expectation of attainment in terms of adopted policies and the environment in which the proposed service operates. Glacier should examine and adjust the standards after the first one to two years of service to incorporate actual experience and assure that goals are realistic, achievable, and quality assuring.

- ***Passenger Trip/Vehicle Mile.*** As a measure of productivity, the passengers per vehicle mile generated by a system is highly dependent on factors such as number of visitors, attractions served by the system, and trip lengths. As a result, the range of experience for passengers per mile is quite large, from 0.20 to 3.00 per mile. Given that the proposed service serves a limited market with long trip lengths, the standard for this measure is recommended at 0.20.

- ***Passenger Trips/Vehicle Hours.*** Another measure of a system's productivity is passenger trips per hour. Passenger trips per hour of similar systems in rural areas range between four and eight. The standard for this measure is recommended at four passengers per hour.

- ***Operating Speed.*** Operating speeds for similar systems in rural areas typically range between twelve and 25 mph. The standard for the proposed service is recommended at 20 mph.

- ***Cost/Mile.*** Cost per mile is a measure of the cost efficiency of the system with respect to vehicle utilization and the amount of vehicle miles of service provided. In systems where vehicles are providing a lot of long distance trips, costs typically range between $0.50 and $3.75 per mile. Given the long distances that vehicles will be accumulating on each run, a standard of $3.75 per mile is recommended for the proposed service.

- ***Cost/Hour.*** Cost per hour assesses the cost efficiency of a system by comparing operating costs to the number of hours the vehicles are in service. Based on the projected number of annual vehicle hours of service and range of hourly operating costs, the standard for this measure is recommended at $30.00 an hour.

- ***Cost/Trip.*** Cost per passenger trip measures the system cost on a per passenger basis. A typical range of cost per passenger trip for a rural fixed route system varies from a low of $1.50 to a high of $9.00. However, given the limited market for the proposed service, the standard is recommended at $15.00 per trip.

The NPS or private operator, depending on who operates the service, should develop and implement a monthly summary system report to calculate each measure and compare them to the established standards. The use of a monthly report would allow the NPS to monitor performance over time and assess what areas of the service might be improved.

The performance-monitoring program should also assess the quality of service provided by the transportation program, although this can be done on a qualitative rather than quantitative basis. Service quality involves the relationship of service delivery and customer expectations and includes such attributes as passenger comfort, reliability, and safety. Each of these attributes is discussed below:

- ***Passenger Comfort*****.** Passenger comfort includes seat availability (do any passengers have to stand?), climate control (is the vehicle too hot or cold?), and smooth ride operations (how well the vehicle is operated by the driver). The number of passenger complaints as a percent of total passenger boarding can measure each of these factors.

- ***Reliability.*** Reliability, which is a function of on-time performance, is one of the measures used to quantitatively define service quality (the relationship of service delivery and customer expectation). For a system of this type, a trip should be considered on time if it occurs between five minutes early and five minutes late. The standard proposed for the service is that 95 percent of all trips operate on time.

- ***Safety.*** Safety is a critical service quality issue. It is often measured as the number of vehicle miles per accident or collision accident. It can also be measured as the number of passenger injuries (or deaths) per 100,000 passenger trips. The proposed service should have no chargeable accidents.

Service Facilities

Transit Centers/Parking. If either Option B or C is chosen, a transit center will be required at both ends of the Road. At the west end, the transit center could be located at West Glacier, Park Headquarters, the "T" intersection, near Apgar Village, or on the outskirts of the park. The transit center could be an independent facility or could be constructed in conjunction with the planned Discovery Center. On the east end of the Road, a transit center could be placed at the St. Mary Visitor Center, Rising Sun, or Sun Point. The transit centers should be designed to include a passenger waiting facility that includes restrooms, phones, and a concessioner. Depending on the design and size parameters of the concessioner facility, it is estimated that the capital and installation costs associated with each transit center building would be between $400,000 to $600,000. The transit centers should be adequately lit and provide emergency phones that connect directly to park staff.

Parking demand at the west end transit center is estimated at 28 spaces for transit users under Option B and 58 spaces under Option C. At St. Mary the needed parking would be fourteen spaces under Option B and 28 spaces under Option C. These estimates are based on the ridership estimates developed for a system without TDM measures.

When the full menu of TDM measures are added, parking numbers could be increased to as many as 740 spaces on the west side of the park and 360 spaces on the east side of the park. These figures are derived using the daily estimates of 3,174 transit passengers explained previously in this chapter under the section titled Projected Ridership. This ridership number is then divided by the average number of passengers per vehicle (2.9) to determine a need for 1,094 parking spaces to accom-

modate this increased demand. Given that 67 percent of Going-to-the-Sun Road users enter at the West Glacier entrance station and 33 percent of the St. Mary entrance station, the parking lot at West Glacier should be built to accommodate 732 spaces and the parking lot at St. Mary should accommodate 361 spaces.

Graphic illustrations of several of the above-referenced parking, transit building, and Discovery Center combinations are presented on the following pages. These figures are not site plans, but rather were prepared to show parking and footprint requirements. Table 17 provides an index to these figures.

Table 17: Index to Transit and Discovery Center Sketches

Figure No.	Page	Title/Description
27	117	West Side Transit Center footprint with 2,000 s.f. transit building and parking for 58 Cars
28	118	West Side Discovery Center footprint with 15,000 s.f. building and parking for 200 Cars
29	119	Combined West Side Discovery/Transit Center footprint with parking for 260 Cars
30	120	West Side Transit Center footprint with aggressive TDM program and parking for 736 Cars
31	121	Combined West Side Discovery/Transit Center footprint with aggressive TDM program and parking for 982 Cars
32	122	St. Mary Transit Center with parking for 35 cars
33	123	St. Mary Transit Center with aggressive TDM program and parking for 362 Cars

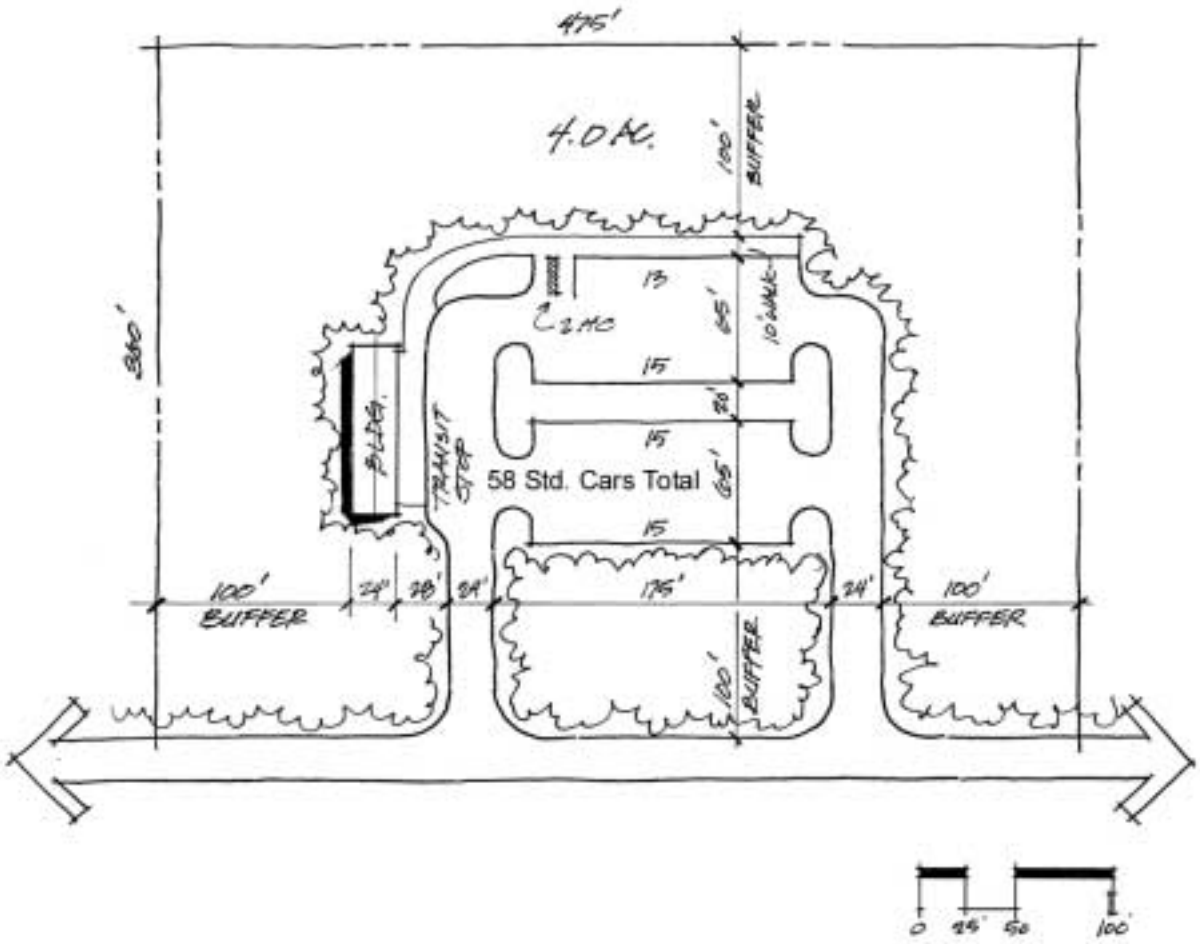

Figure 27: West Side Transit Center Footprint
2000 s.f. transit building and parking for 58 cars

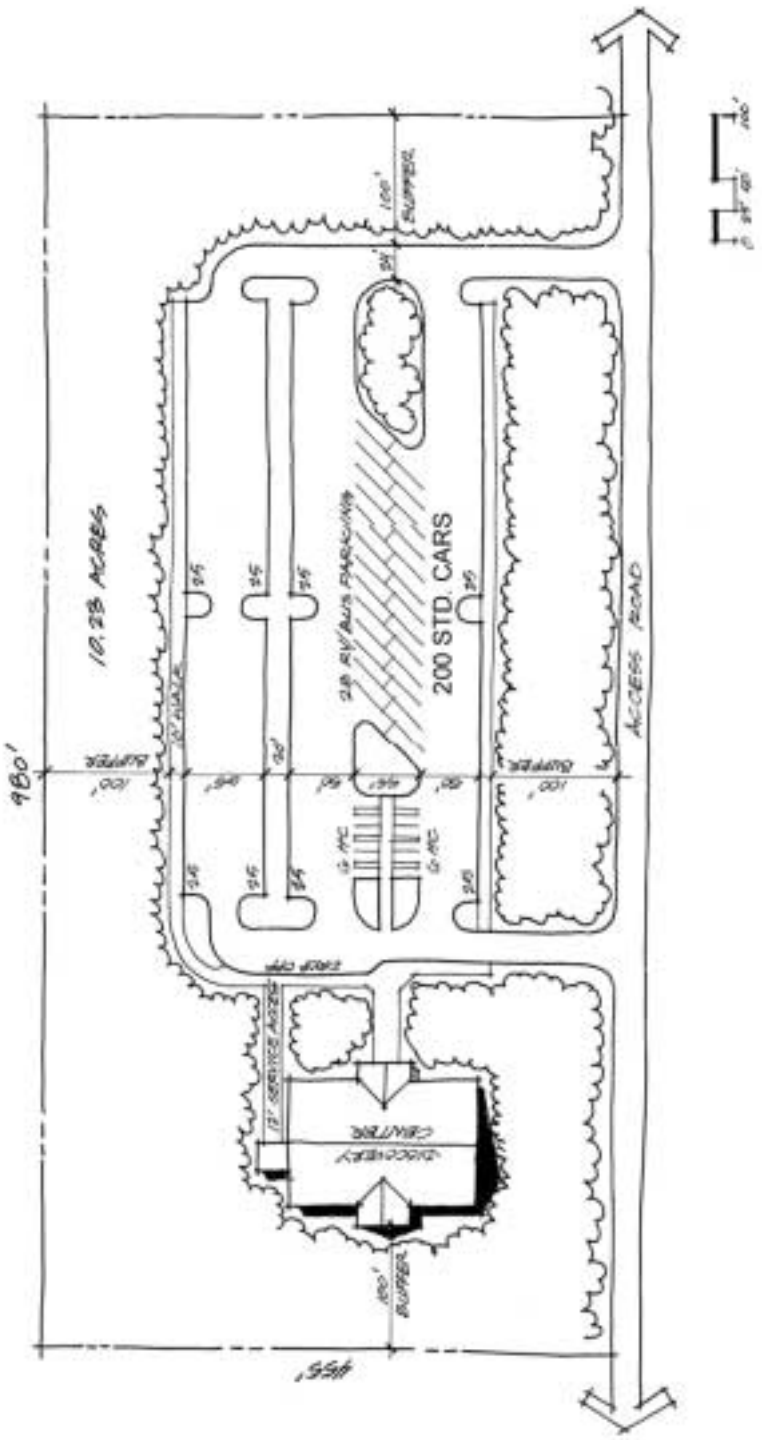

Figure 28: West Side Discovery Center Footprint
15,000 s.f. building and parking for 200 cars

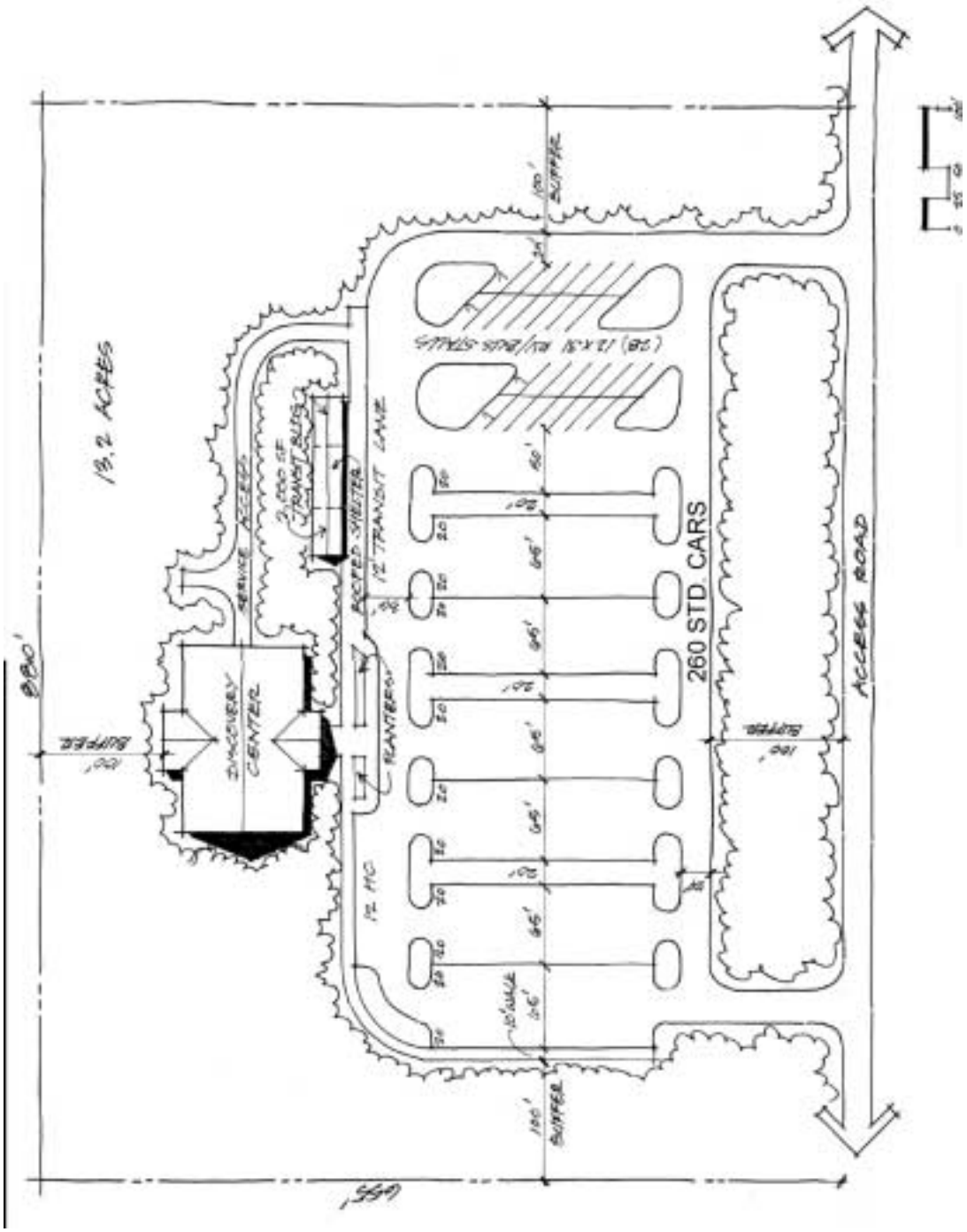

Figure 29: Combined West Side Discovery/Transit Center Footprint
with parking for 260 cars

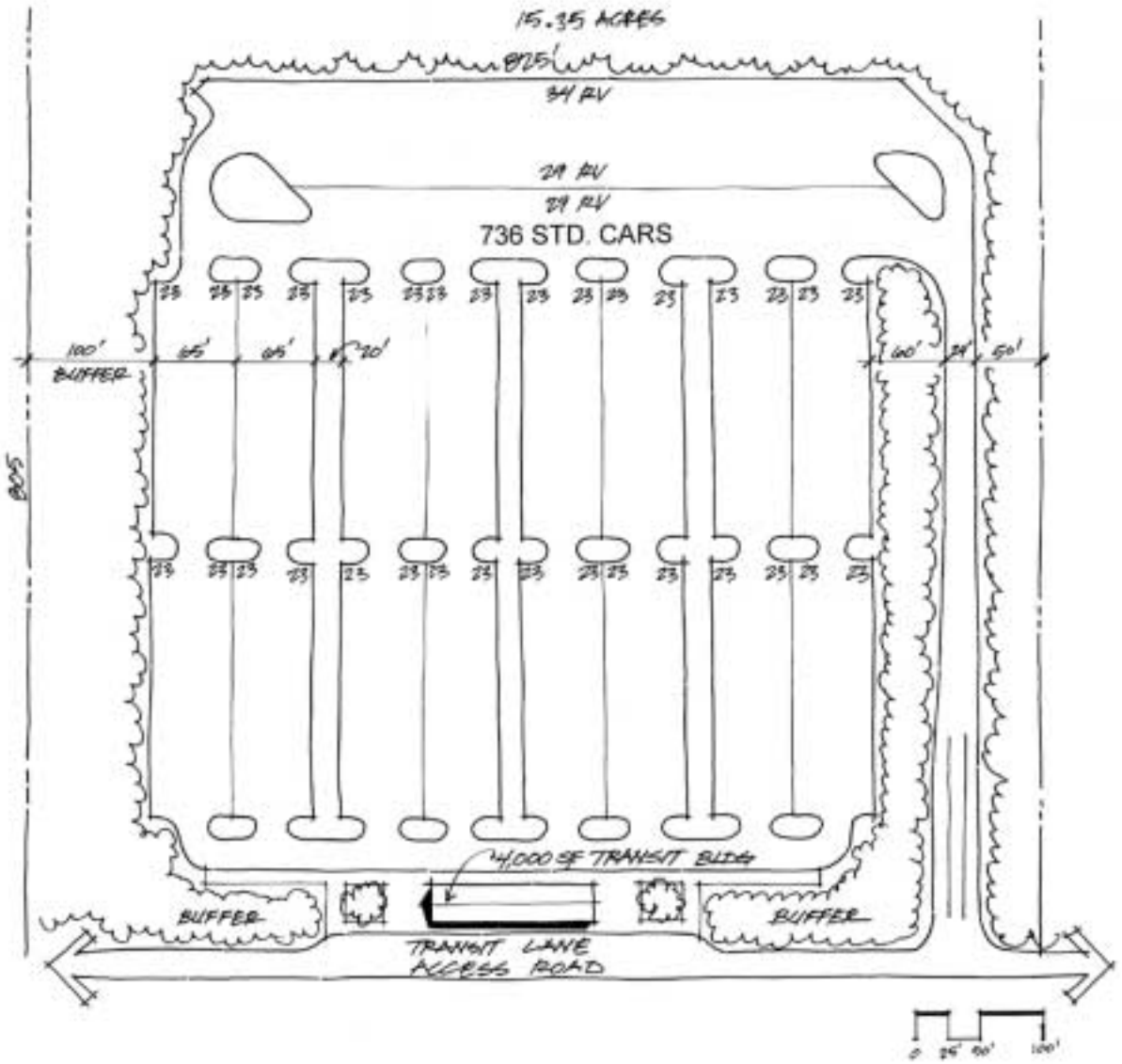

Figure 30: West Side Transit Center Footprint with Aggressive TDM Program
and parking for 736 cars

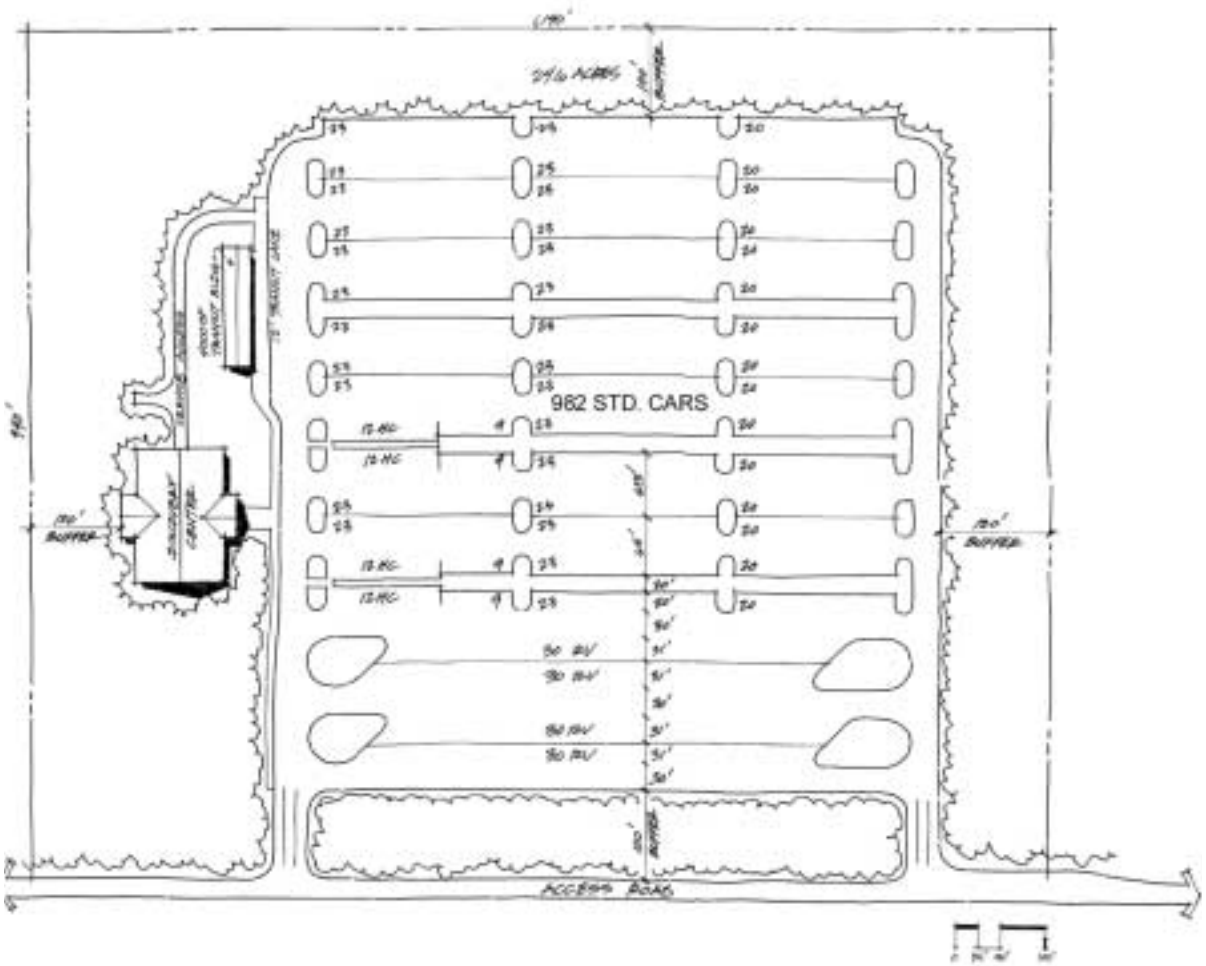

Figure 31: Combined West Side Discovery/Transit Center Footprint with Aggressive TDM Program
and parking for 982 cars

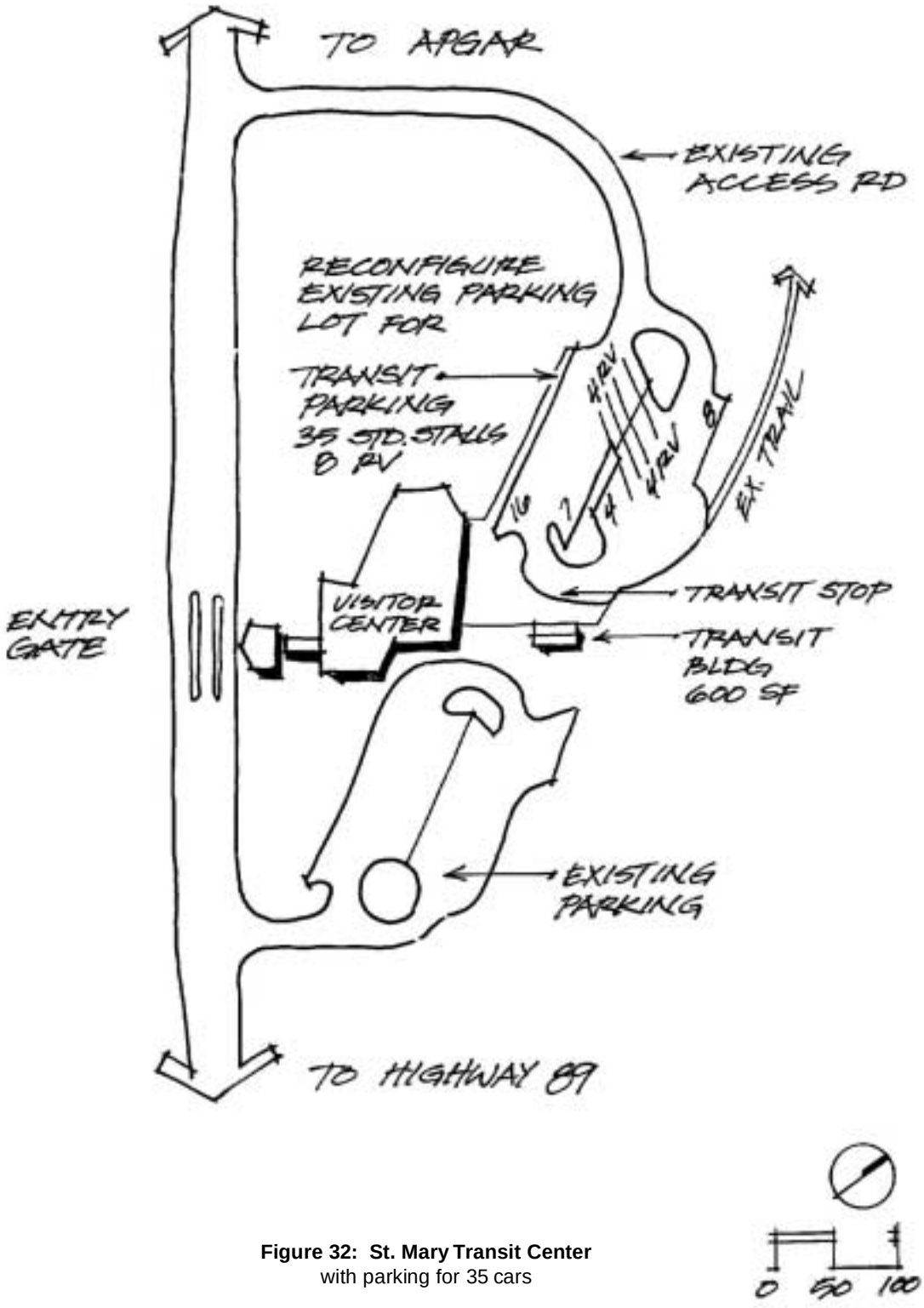

Figure 32: St. Mary Transit Center
with parking for 35 cars

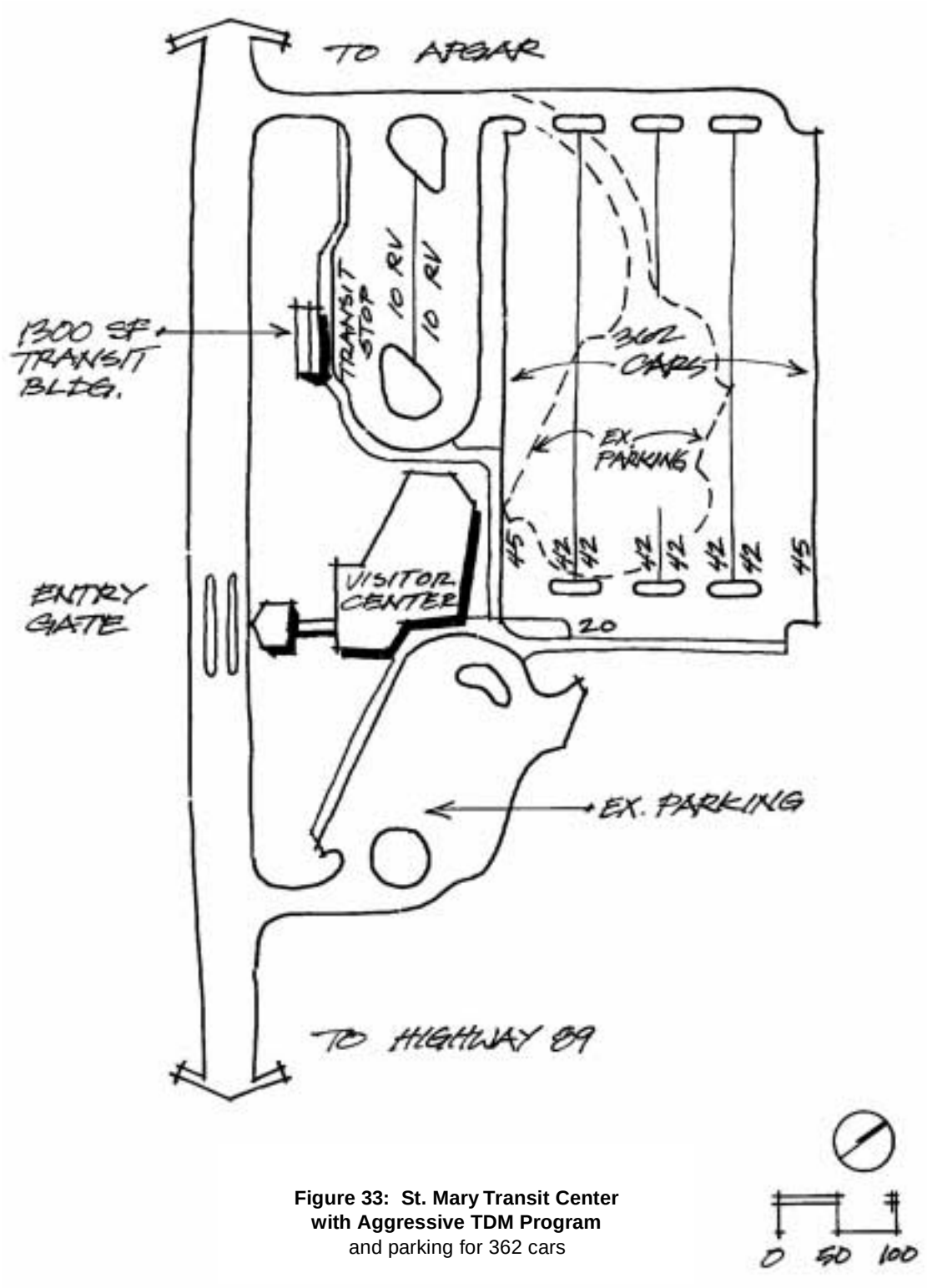

Figure 33: St. Mary Transit Center with Aggressive TDM Program
and parking for 362 cars

Figures 34 through 38 show the Transit/Discovery Center at various locations on the west side of the park. These figures are presented to depict relative size. In these figures the letters A, B, C, D, and E have the following meanings:

A = Transit Center Footprint (4.0 acres)
B = Discovery Center Footprint (10.23 acres)
C = Transit and Discovery Center Footprint (13.2 acres)
D = Aggressive TDM Program Transit Center Footprint (15.25 acres)
E = Aggressive TDM Program Transit Center and Discovery Center Footprint (24.6 acres)

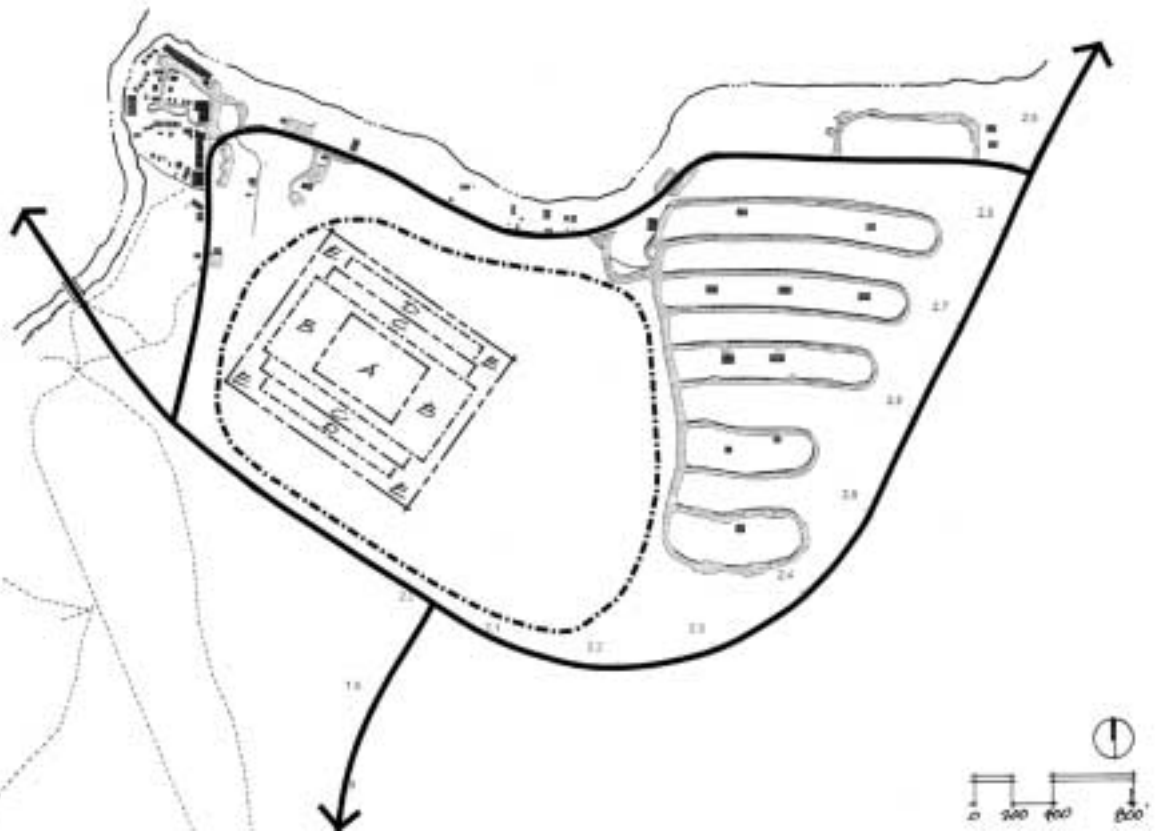

Figure 34: West Side Transit/Discovery Center North of Apgar Village

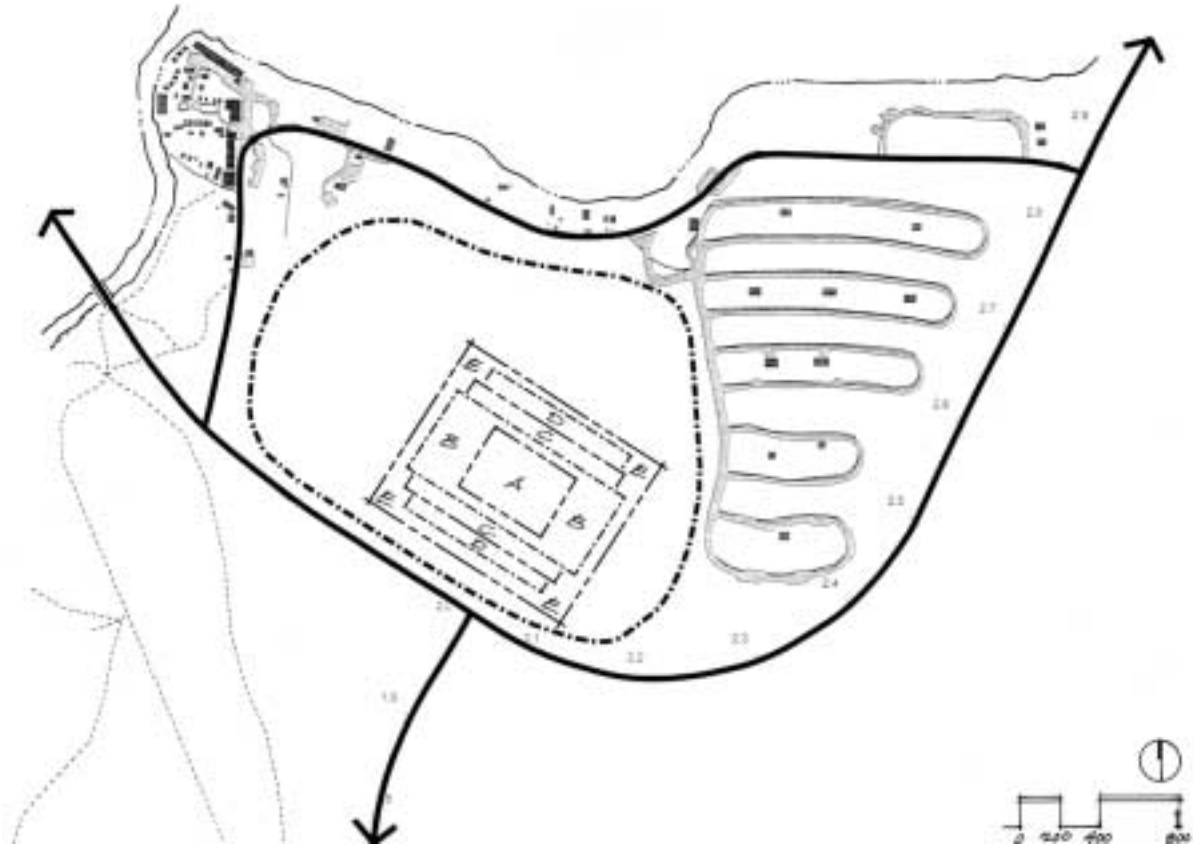

Figure 35: West Side Transit/Discovery Center
North of "T" Intersection

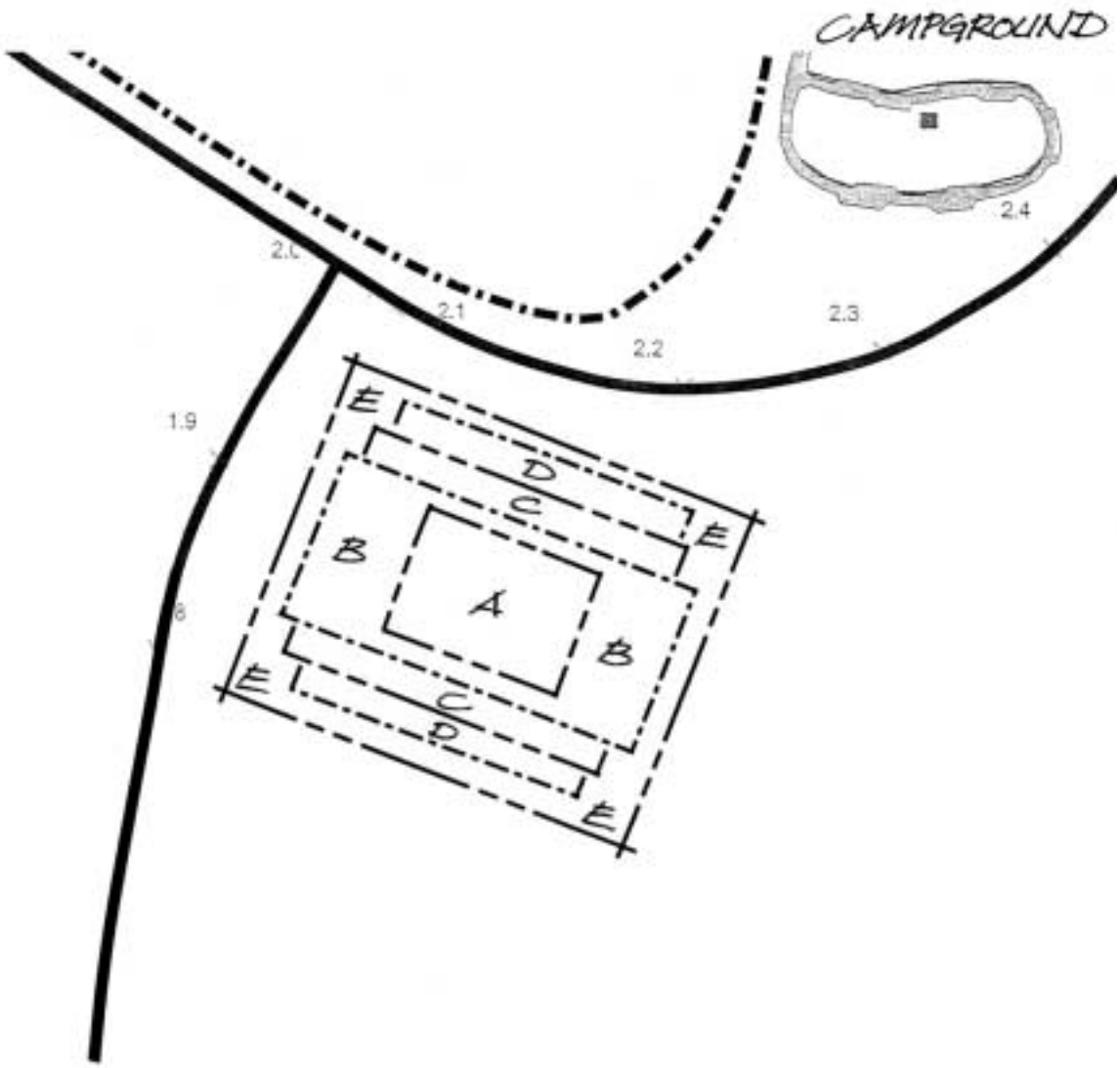

Figure 36: West Side Transit/Discovery Center
Southeast of "T" Intersection

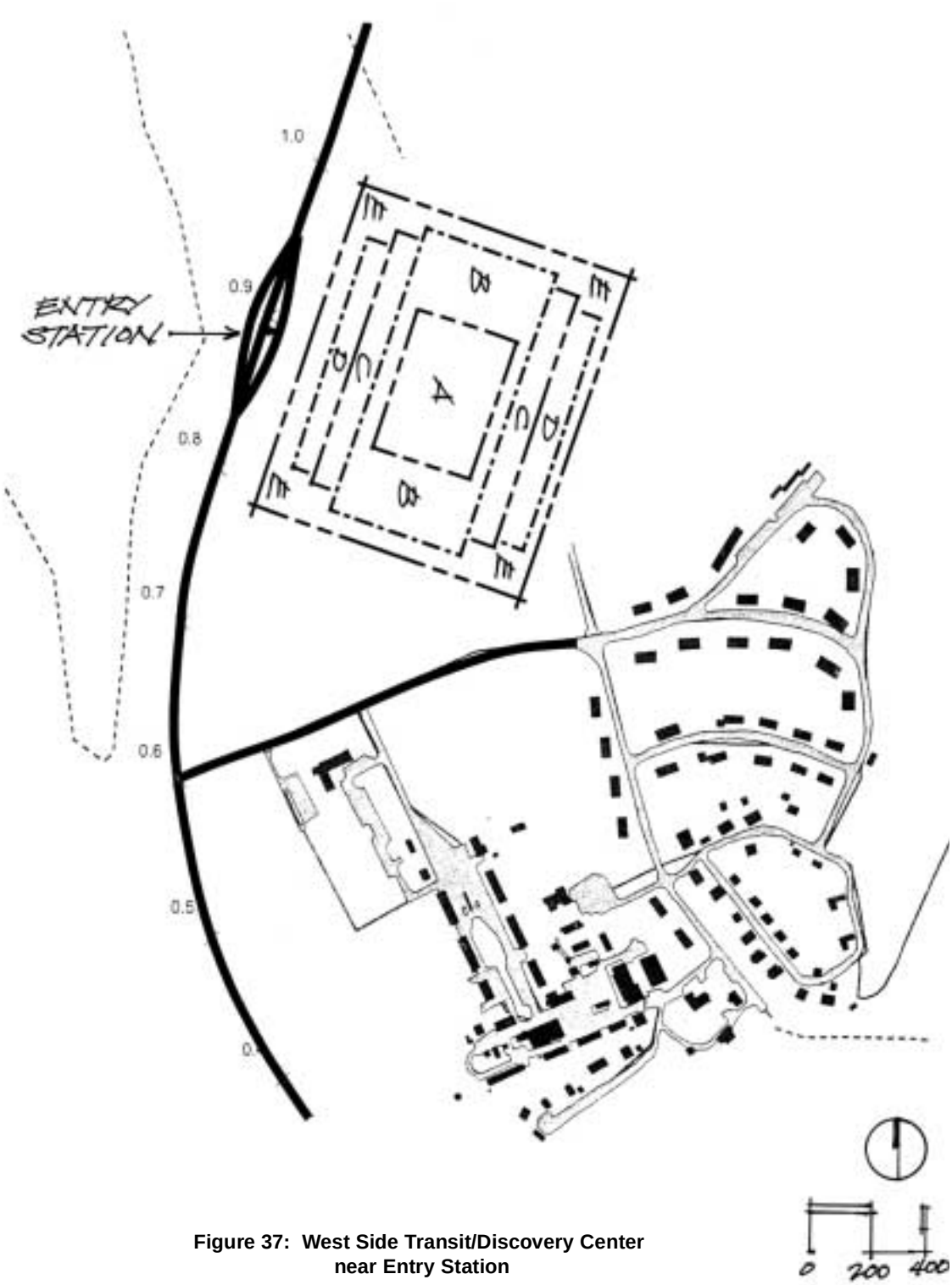

Figure 37: West Side Transit/Discovery Center near Entry Station

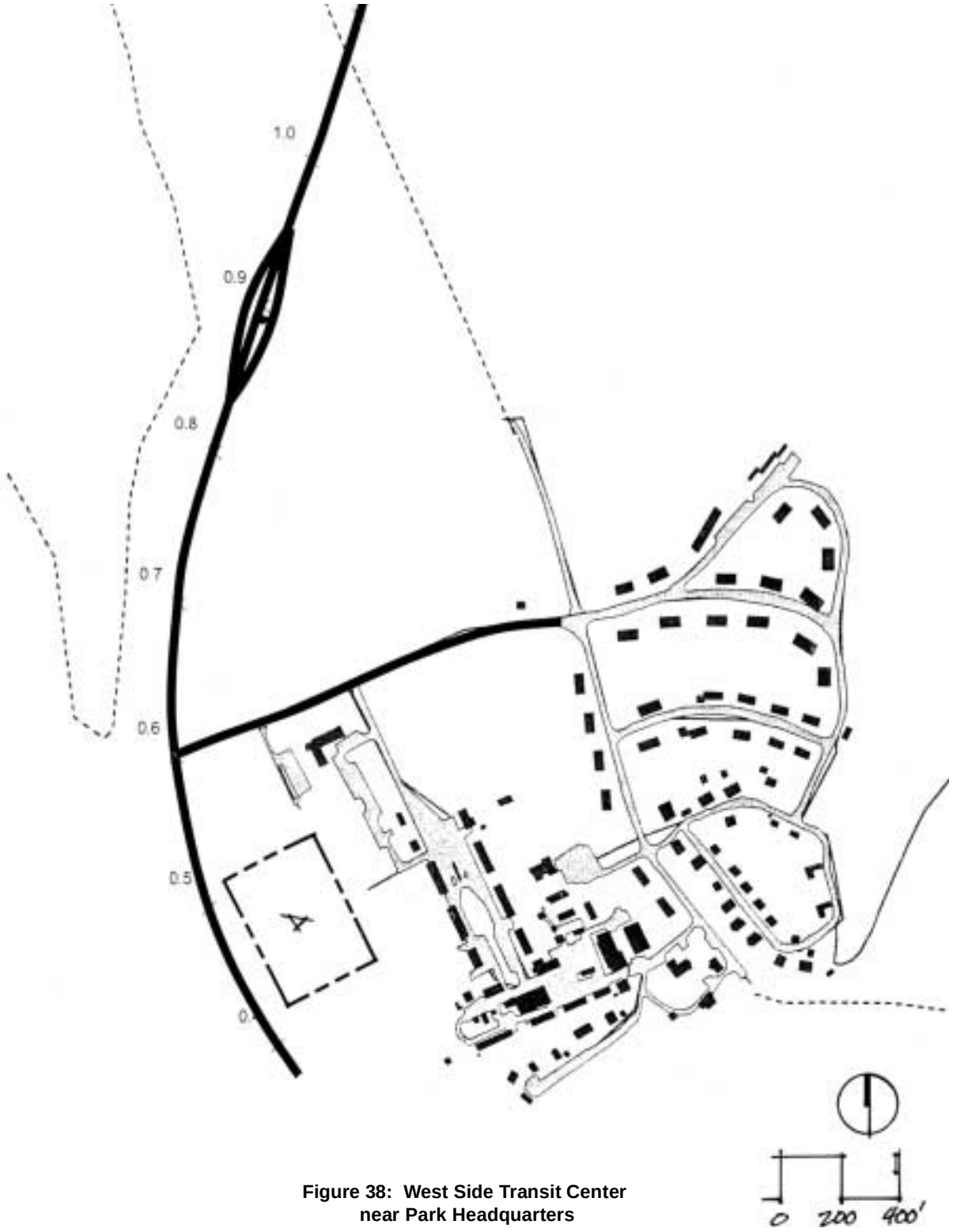

Figure 38: West Side Transit Center near Park Headquarters

Bus Shelters. Bus shelters should be installed at some of the higher volume traffic stops along the route. At a minimum, bus shelters should provide protection from sun, rain, and snow; promote cross-ventilation to alleviate air stagnation; shield passengers from blowing rains, windy conditions, and snow flurries; and incorporate benches and/or leaning rails, route maps, and other appropriate customer amenities. Informational signs could also be placed at bus stops to provide educational reading opportunities while waiting for a bus to arrive. Advanced intelligent transportation system (ITS) applications may also one day be provided which inform waiting passengers of exactly how many minutes they will have to wait for the next transit bus with a real-time countdown. As an added security measure, all bus shelters and stops could be provided with emergency phones that are connected to park offices and/or transit operators (see Chapter 4 for indications on how this could be implemented).

Bus shelter costs can vary depending on the design and size of the shelter. Standard metal mesh shelters with shatterproof glass cost less than $5,000 installed, depending on the dimensions and various features chosen for the shelter. It is likely that bus shelters for the park would require more careful design considerations to blend into the natural environment and would cost between $15,000 and $25,000 installed. Some shelters should be removable due to prevailing environmental factors, such as avalanche hazards. In addition to the capital costs of the bus shelters, maintenance costs should also be taken into consideration.

Funding Sources

While the service detailed above could cover operating costs with transit user fees and/or entry fee surcharges, the NPS will need capital funding to pay for infrastructure improvements (bus shelters, signs, restrooms, etc.), and possibly the initial purchase of vehicles (if the NPS elects to directly purchase these rather than have a private operator provide them).

Funding sources that have been used by other National Parks (Acadia, Zion, and Grand Canyon, for example) to fund capital projects are options that can be investigated for Glacier. These include:

- National Park Service
- U.S. Department of Transportation
- U.S. Department of the Interior
- Special federal appropriations (e.g., the Transit in Parks legislation)

- Montana Department of Transportation
- Local cities and towns
- Sponsors
- Volunteer staff
- Additional increases in entrance fees

There are also opportunities available through various federal grant programs to purchase transit vehicles for systems such as the one proposed for Glacier. These grant programs include the 5310 Bus Replacement Program through the Federal Transit Agency and the Construction Mitigation Program available through the Transportation Efficiency Act for the 21st Century (TEA-21).

Marketing/Promotion/Visitor Information

To encourage visitors to use transit during rehabilitation of the Road, the NPS should produce brochures that include a route map and schedule for the service. These brochures should be made available at the visitor centers and other locations along the route as well as at area hotels and campgrounds. This information should also be placed on the Glacier National Park website.

In addition to the brochures, signs indicating where visitors should park who wish to use the shuttle should be placed at park entrances. The signs should also indicate the fare for the shuttle.

Marketing and promotion are an element of the overall incremental Transportation Management (TDM) strategy that would be needed to successfully implement the transit shuttle system.

Additional and Long-Range Shuttle Service Options in the Park

GPI currently operates a shuttle route from Many Glacier Hotel to Logan Pass, providing one complete westbound morning trip from Many Glacier Hotel/St. Mary to Logan Pass between 7:30 a.m. and 11:00 a.m., and one westbound afternoon round trip from Many Glacier Hotel/St. Mary to Logan Pass between 3:25 p.m. and 7:20 p.m. During the road rehabilitation project and beyond, the park should consider replacing this route with an “on-demand” shuttle system, also known as a “Dial-A-Ride” system. This separate, on-demand transit system would operate on an as-needed basis to provide connections from Many Glacier, Two Medicine, and perhaps Cut Bank to St.

Mary and the Going-to-the-Sun Road shuttle system. A visitor desiring such a connection would call a local phone number and reserve a seat and time on the on-demand transit vehicle. This type of additional transit service would be of great use to hikers who need to get from one terminus of a trail to the other before and after their hike. A broad estimate of the cost of operating an on-demand system such as this would be approximately $20,000 per year.

After completion of the Going-to-the-Sun Road rehabilitation, both the proposed shuttle and the on-demand transit service should continue to be operated. The NPS should monitor each of these systems' performance during construction and determine if service needs to be increased or decreased depending on demand.

Improved Regional Connections

Several large transportation operators provide service to the area around Glacier. Visitors enter the region by rail, bus, air, or private vehicle.

- ***Rail.*** Train service to West Glacier and East Glacier delivers people in close proximity to the park. The West Glacier stop is located within walking distance of the park entrance; however, most park attractions are located several miles from this entrance. Train passengers can take bicycles on trains only in boxes. The West Glacier stop does not have station attendants to allow passengers to retrieve boxed bicycles or luggage from the luggage car. The East Glacier stop does offer these services. GPI offers daily scheduled shuttle service from the West Glacier train station for guests staying at hotels inside the park.
- ***Bus.*** Greyhound has two regional ticket centers in the Glacier area. Both (Kalispell and Whitefish) are located 26 miles from the West Glacier park entrance. Big Fork and Cut Bank have limited service bus stops with no ticketing or baggage facilities.
- ***Air.*** According to the 2000 Survey of Visitors, 29 percent of respondents arrived in the Glacier area by airplane. Of these, 40 percent land at Glacier International Airport in Kalispell, with significantly smaller percentages arriving at Missoula, Calgary, Seattle, and Spokane (no more than ten percent at each airport). Glacier International Airport is located 25 miles from the West Glacier park entrance. Passengers arriving at this airport have several options for car rentals; however, no scheduled park shuttles are available. Seventy-three percent of park visitors arriving at this airport enter the park through the West Glacier entrance. This demonstrates a strong point-to-point attraction ideal for transit service if connecting times could be coordinated.

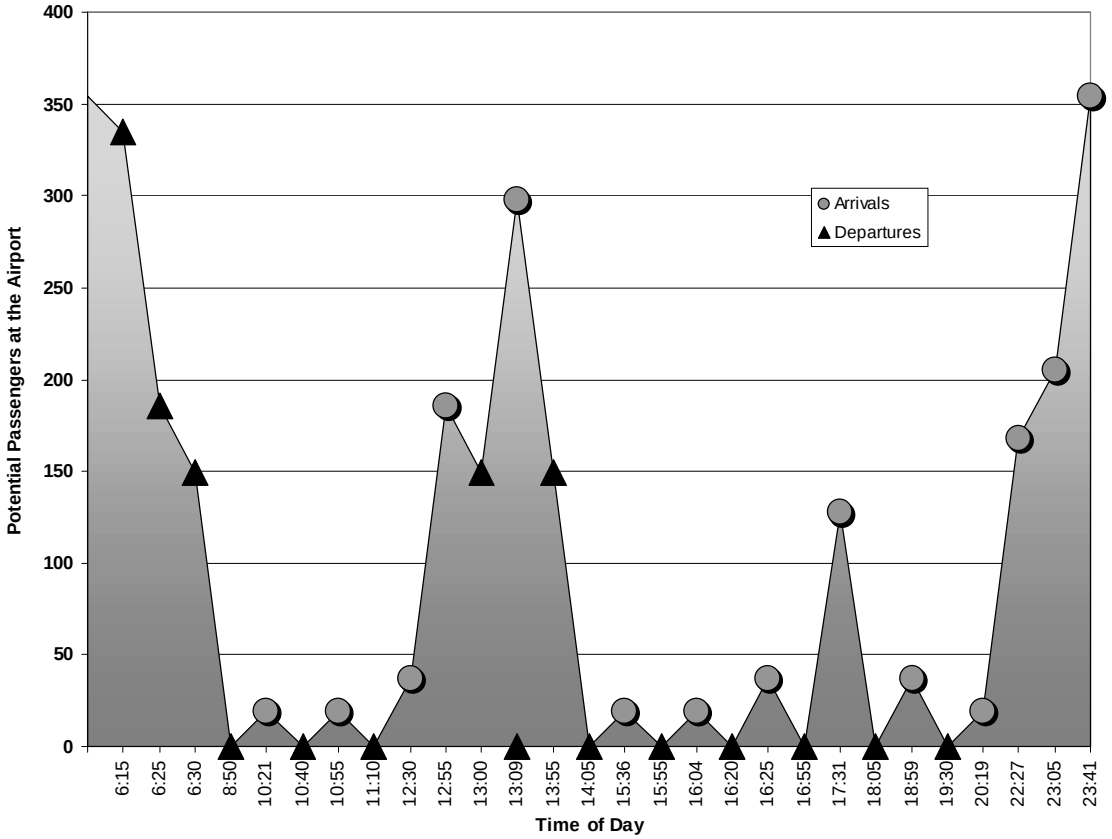

Figure 39: Passenger Flow at Glacier International Airport, Summer 2001

Four carriers serve Glacier Park International Airport. Airline flights into the airport generally concentrate arrivals and departures in groups (see Figure 39).

Based on this information, transit operators could schedule routes to accommodate passengers when they arrive or depart the airport. If such a schedule is established, park visitors could plan their trips without renting a vehicle to get to the park. If regional providers deliver passengers to Glacier National Park, the park will need to provide supporting transit service to take visitors to key destinations in the park. In coordinating with regional providers, Glacier should encourage the use of fully accessible (ADA) buses equipped with bicycle racks.

Park employees could also use the shuttle for trips to the airport, which would benefit the employees by eliminating two vehicle trips and parking fees at the airport. Also,

the valley would benefit from reduced traffic on Route 2 through Columbia Falls and Kalispell.
Transit providers would have a viable customer base for the route. Other stops along the route could include central locations in Kalispell, Whitefish, and Columbia Falls, as well as the major campgrounds along Route 2 en route to the park. Some campers may choose to leave their vehicle at their campsite instead of driving to the park once reliable transportation alternatives are established. In addition, the transit provider could serve downtown districts in Kalispell, Whitefish, and Columbia Falls during the long breaks between airport drop-offs and pick-ups.

Visitors on the east side of the park primarily come from beyond the surrounding region. Many travel on a park tour north from Yellowstone or south from Waterton. The east side entry stations report a substantial number of visitors shared between Waterton and Glacier parks. Many hikers and boaters inquire about transportation at the end of their one-way trips to or from Waterton in Canada. GPI does not have international jurisdiction to run shuttles to Waterton; however, the company has plans to apply for the appropriate permits in 2002.

Transportation Management Strategies

As the ridership numbers above reveal, transportation management will be necessary for transit to become an effective congestion mitigation measure. In fact, the transit system proposed for the park does not make sense without such a program as it is extremely costly and does not make a significant impact on traffic reduction. The primary purpose of a Transportation Management (TDM) Program is to reduce travel demand and improve utilization of the transit system. An effective TDM program must be put in place at the park that includes incentives, disincentives, and supporting measures to get the park visitor to choose the transit system over their private automobile.

Incentives are measures that make riding the transit system more appealing to the visitor and would not penalize the user of the private automobile. Examples of incentives include:

- Subsidies
- On-demand transit
- Transit expansion
- Park-and-ride lots

- Seamless intermodal links
- Free or reduced transit fares
- Reduced park fees for transit users
- Connections to regional transit

Disincentives are measures that negatively impact the visitor using a private automobile and therefore make the visitor more likely to seek out the transit system as an alternative to driving. Examples of disincentives include:

- Maximum parking duration
- Auto-free zones
- Congestion pricing
- Limited capacity for private autos
- Paid parking
- Limited parking supply
- First-come, first-served access
- Increased private vehicle entry fees

Supporting Measures provide information and services to assist the visitor in selecting the transit system as the preferred method of traveling on the Road. Examples of supporting measures include:

- Transportation coordinator
- Transportation information centers
- Real-time traffic information
- Transportation information program
- Bicycle and pedestrian improvements
- Inviting transportation facilities

The most reasonable strategy for implementing a TDM program at the park is an incremental approach. The number of TDM measures applied depends on the extent to which traffic exceeds a defined target. In this case, the defined target must be determined. If it is assumed that traffic on the Road during peak periods reaches unacceptable levels of congestion, and that traffic congestion will be exacerbated during rehabilitation of the Road, a reasonable target would be to reduce traffic by fifteen percent (studies have shown that a ten to fifteen percent reduction in traffic results in a significant reduction in congestion). Public awareness elements of the TDM program give park visitors the opportunity to change their behavior to avoid additional TDM measures such as higher entrance fees or limits on vehicle access to the Road. Additionally, an incremental TDM program approach allows decision makers at the

park to learn from past successes and failures so that they can more accurately predict the impact of future TDM measures.

Incremental TDM Program Requirements

A major feature of an incremental TDM program is the collection and analysis of data. The program monitors average daily traffic (ADT) during the peak season and responds by implementing TDM measures whenever the traffic target in exceeded. If the ADT count shows that the target has been exceeded by less than five percent, no additional traffic monitoring is needed. If the ADT counts reveal that the target is exceeded by five percent or more, additional monitoring is conducted, including:

- a survey to measure trip purpose by time of day, average car occupancy, and origin and destination
- a parking utilization study to determine the use of parking by time of day and length of use

The traffic monitoring results will help determine if any modifications need to be made to the TDM program to achieve the established target. TDM program elements are classified into three levels plus supporting actions:

- Level 1: Early action items implemented concurrent with the transit system.
- Level 2: Programs designed to reduce traffic by up to five percent.
- Level 3: Programs designed to reduce traffic by five to fifteen percent.
- Supporting Actions: TDM measures that would help ensure the success of Level 1-3 programs.

Level 1. The items below should be implemented as soon as possible to help reduce daily vehicle trips and get the visitor accustomed to using transit. The focus of these items is to build the organizational structure for implementing the TDM program, and to start initiating changes in driver behavior:

- ***TDM Program Authority.*** An authority needs to be established to oversee the TDM program and recommend the implementation of TDM measures. This authority should come in the form of an official policy adopting the TDM program and the appointment of a team of NPS staff members (and perhaps other outside stakeholders) to recommend TDM decisions to park management.

- ***Program Director.*** A full-time program director will have the responsibility of implementing the TDM program. The program director's primary role will be to secure program funding, coordinate with the NPS and adjoining jurisdictions, act as a community liaison, be a spokesperson for the program, and establish relationships with key stakeholders and park visitors. Up to two additional support staff may be required to carry out marketing, accounting, and program administration functions.
- ***Implement Improved Transit System.*** A transit system on the Going-to-the-Sun Road must be continued and preferably expanded to at least the level of Option B or C. Option A (Existing Service) will not be capable of providing sufficient supply for the increasing demand.
- ***Information Support.*** A strong information system will increase awareness of the TDM program's goals and help vest the park and surrounding communities in the program's success. Information support mechanisms include transit kiosks, trip planning, transit literature, on-line route information, ITS applications, parking controls, and targeted marketing. Examples of information support include:
  - Press releases and radio and television spots that discuss traffic levels and potential TDM measures that might need to be applied
  - Information sent to park visitors explaining transportation options
  - Information disseminated to park and concession employees explaining the need for the TDM program
  - TDM packets sent to area residents and communities explaining the program and the community's role in the program's success
- ***Monitoring.*** A permanent set of road counters will gather traffic count data and display the number of vehicles that pass a given point in the Road corridor. Display options include showing the actual daily total that changes as a car passes, or a predicted total for the day that estimates whether the target is likely to be exceeded on that day.
- ***On-Demand Transit for Non-Going-to-the-Sun Road Trips.*** An on-demand system to link other areas of the park (Many Glacier, for example) to the shuttle system on the Going-to-the-Sun Road can provide further alternatives for the park visitor. For example, hikers could use such a system to get them back to their campsites in the Going-to-the-Sun Road corridor after hiking over to the Many Glacier or Two Medicine areas.

Level 2

- ***Improved Transit.*** The transit system is improved to be more appealing to potential riders. Improvements can include reducing headways, providing quicker route times through construction areas, and covering larger areas. One example of this is an expanded regional system.
- ***New Capacity for Transit Service.*** Parking areas and transit facilities can be enlarged to provide greater capacity for transit users. Larger, 25-seat buses can also replace the 15-passenger vans if the vans are chosen as the initial rolling stock for the system.
- ***Improvements to Transit System.*** The transit system can be enhanced with "smart" sign systems (ITS) that can tell users when (in real-time) the next transit vehicle is to arrive; specialty vehicles, such as replicas of the red buses, could be added to the fleet; and/or added value incentives, such as reduced entrance fees, can be provided to transit users during peak times.
- ***Increased On-Demand Transit.*** The on-demand system described above can be expanded to provide access to other areas in the park or to provide access to the park for the airport or gateway communities. For example, backcountry enthusiasts could also use the on-demand system for ingress and egress to Bowman Lake on the West side of the park.
- ***Minor Increase in Private Vehicle Entry Fees.*** A small increase in the entry fee surcharge for transit would further deter private auto use and provide additional funding for system improvements.
- ***Vehicle Metering.*** The number of vehicles allowed on the Road per hour is limited, and visitors arriving after the limits have been met must take transit.

Level 3

- ***Cap on Private Autos on Going-to-the-Sun Road.*** With the help of accurate traffic monitoring, limits on the number of private autos allowed on the Road are enforced. After the limits are reached, visitors must use transit to travel the Road.
- ***Auto-free zones.*** Some key attractions, such as Logan Pass, Apgar Village, or Avalanche are restricted to transit and non-vehicular access only.
- ***Major Increase in Entry Fee Surcharge for Private Autos.*** Those choosing to use private autos for access to the Road pay a higher fee than those choosing to use transit.

- ***Totally Subsidized Transit.*** Park visitors are not charged a fee for using transit.

Supporting Actions

- ***Specific Parking for Transit.*** The park provides specific parking areas and facilities for transit users.
- ***Bus Stop Shelters.*** Shelters are provided at each transit stop.
- ***Bicycle and Pedestrian Facilities.*** Bike and pedestrian facilities such as an increased number of bike paths, bike lanes and sidewalks, as well as bike racks on transit vehicles and “share the road” signage are used to encourage non-vehicular transport in the park.
- ***Provide for Recreation Equipment on Transit.*** Transit vehicles are equipped to carry recreational equipment such as backpacks and bicycles.
- ***Employees Riding Transit.*** A policy is established encouraging park and concession employees to use transit to get to and from work areas.
- ***Transit Information Systems.*** A comprehensive information system is provided to inform park visitors about transit options.

Table 18 provides examples of TDM measures for each level:

Table 18: Examples of TDM Measures

Level 1	Level 2	Level 3	Supporting Actions
TDM authority Program staff Permanent road counters Implement improved transit system Information support: • Transit kiosks • Trip planning • Transit literature • On-line route Information • Parking controls • Targeted marketing On-demand transit for non-Going-to-the-Sun Road trips	Improved Transit: • Shorter headways • Larger area coverage • Increased subsidies New capacity for transit service Improvements to transit system Increase on-demand transit Minor increase in park entry fee surcharge for private autos Vehicle metering	Cap on private autos Going-to-the-Sun Road Auto-free zones (Logan Pass, Apgar, Avalanche) Major increase in park entry fees for private autos Totally subsidized transit (no fare for transit riders) Required transit usage for backcountry users Required transit usage for day hikers	Expanded parking for transit Bus stop shelters Bicycle and Pedestrian facilities Provide for recreational equipment on transit Employees riding transit Transit information systems

Once incremental measures have been established and categorized, the TDM program will dictate when the various levels should be implemented (Table 19):

Table 19: TDM Monitoring and Implementation

Monthly ADT Compared to the Target	Monitoring Action Required	TDM Measure Required
Equal or Below	ADT Counts	Continue with early action items
Less than 5% above	ADT Counts	One Level 2
Between 5 and 10% above	Counts/Survey/Parking	Two Level 2 and 1 Supporting
10 % or Over	Counts/Survey/Parking	One Level 3 and 1 Supporting

Costs of the TDM Programs

Table 20 shows cost estimates for implementation of the early action TDM measures. The overall costs of particular TDM measures vary considerably due to regional variations, number of participants, and economies of scale. Costs are based on similar programs that have been successfully implemented in the past.

Table 20: Estimated Cost of Early Action TDM Measures Implementation

TDM Measure	Annual capital cost	Annual Operating cost
Full-time Coordinator Plus marketing (includes a minimum of one program administrator, or a maximum of one administrator, two staff personnel, and a marketing program		$75,000 - $200,000
Permanent Road Counter (each)	$4,000 - $5,000	
Intercept Survey	$10,000	
Roadside Display (each)	$30,000 - $35,000	
Supporting TDM Actions		$30,000 - $100,000

The Incremental TDM program proposed will require constant and extensive advanced planning. Once the ADT target is exceeded it will be necessary to get additional TDM measures implemented quickly so the visitor's behavior is adjusted prior to the next monitoring period. Future programs will have to be planned in detail with budgets estimated prior to implementation. Additionally, any revenue generating mechanisms will have to be developed and in place prior to the implementation of a new TDM measure.

Cost of a Comprehensive Transit System/TDM Program

The costs and descriptions presented above can be used by NPS staff as a "menu" on which to build a preferred transit system and TDM Program. Table 21 includes an example of such a comprehensive approach that may be suitable for placement in conjunction with the Road rehabilitation project:

Table 21: Example Cost of a Comprehensive Transit and TDM Program

Transit System/TDM Measure	Cost	
Transit System		
Transit system as per Option B, 25-passenger buses (assumes a $30/hr operating cost)	Capital costs (buses): Operating costs (annual):	$ 542,500 $ 205,000
Two transit centers (Apgar and St. Mary)	Construction costs:	$ 800,000
Bus shelters at all stops (historically accurate)	Construction costs:	$ 250,000
On-demand transit system to serve Many Glacier and East Glacier	Annual cost:	$ 20,000
TDM Program –Level 1(Early Action)		
Full-time coordinator plus marketing and staff	Annual Cost	$ 125,000
Permanent road counters (3)	Construction Costs:	$ 15,000
Intercept survey	One-time Cost:	$ 10,000
Roadside ITS displays (2)	Construction Costs:	$ 70,000
Supporting TDM programs	Annual Cost:	$ 70,000
Total Costs	One-time, Initial Costs: Ongoing, Annual Costs:	$ 1,687,500 $ 425,500

One-time capital costs for this proposed comprehensive approach would need to be funded through a combination of park budget and federal grant opportunities. Ongoing annual costs could be funded through an entry fee surcharge of $3.65 per vehicle.

Transit Summary

The purpose of this chapter has been to develop transit options for evaluation in the upcoming Environmental Impact Statement. In pursuing this purpose, a substantial amount of detailed technical information has been presented. To refocus the discussion on the visitor use aspect, the following illustration of a typical transit rider's experience is presented. This story includes, in layperson's terms, concepts such as route length and time, headways, schedule, stops, vehicle type, fares, and service facilities. This illustration assumes that Option C, with 30-minute headways, is operating on the Road. The visitors in our illustration are George, his wife Martha, and their ten-year-old daughter Amy. They are a family from the Midwest.

George and Martha have long wanted to visit Glacier National Park, and this year they decide to make a point of doing so. George asks Martha and Amy to gather information needed to plan their trip. Martha starts with a trip to the library. Amy turns to the internet. A few days later they regroup to discuss what they have learned. Martha starts by relating glowing descriptions of Glacier's scenery and history and shares a list of some of the interesting things they should be sure to see while there. Amy relates information she found on the park's website, including a thorough discussion on the rehabilitation of the Going-to-the-Sun Road and the park's new transit service. The transit service is not mandatory, but George and Martha are so impressed by the information Amy has found that they decide to use the transit system anyway (secretly, George has been somewhat apprehensive about driving the mountain roads in the park and is relieved to learn there is another option).

George, Martha, and Amy arrive in West Glacier near the end of July. Signs near the park entrance clearly guide them to a convenient parking area and transit center. They park their car for the last time that day and walk to the small, inviting building. A friendly park employee asks if they would like information on the transit schedule and stops. George politely declines, replying that they already have the information from the internet, and gesturing toward Amy. George hands over $12 to purchase three tickets and then checks out the concession items. Checking his watch, George moves his family outside in anticipation of the bus's arrival and their coming adventure. Wanting as much time as possible in the park, the family has selected one of the earlier buses which leaves the west transit center at 8:00 a.m.

The bus leaves right on time. The family has hardly settled into their seats when the bus arrives at its first stop – Apgar Village. The family gets off and enjoys their first views of Lake McDonald and the dramatic mountains ahead. They take photographs

of one another standing at the Lake's edge and read the interpretive signs. They still have nearly ten minutes until the next shuttle arrives so George takes in the visitor center while Martha and Amy check out the shops in the Village. Overall, they have been there a half hour when the next bus arrives to take them on their way.

The family's next planned stop is Lake McDonald Lodge, where they hope to check out the historic building they have read so much about. Behind the Lodge, Amy finds the boat tour operation. They do not have time for a boat tour today, but they take a flyer so they can plan a boat trip later in their stay. A half hour is spent at the Lodge, and then they hop back on the next shuttle.

So far the family has spent about 30 minutes each at Apgar Village and Lake McDonald Lodge, and 30 minutes in transit. Their shuttle leaves Lake McDonald Lodge around 9:30 a.m., continuing east.

Next stop, the Trail of the Cedars. This has been described in the tour books as a "can't miss" spot along the Road. The bus arrives at the Avalanche stop (also Trail of the Cedars) just under fifteen minutes after leaving Lake McDonald Lodge. The family spends about 45 minutes enjoying the dark forest through which the trail passes. Back at the shuttle stop, they now have fifteen minutes before the next bus is scheduled to arrive. They take advantage of the time to visit the comfort station and review their schedule for the day. It is already almost 10:45 and they have not yet reached the most anticipated portion of the Road. However, from the size of the crowds around Avalanche, it seems that many people are no further along then they are.

Despite the crowds at Avalanche, the shuttle has several empty seats when it leaves. In fact, every shuttle they have been on so far has had only a few riders other than themselves. The family has decided that, to make up a little time, they will stay on the bus through the next couple of stops. As the bus rounds The Loop, the family gets their first taste of what lies ahead and the wonder of Going-to-the-Sun Road. Now they appreciate the bus's large, oversized windows even more than they did on the lower sections of the Road. The glass is clear and clean and the bus goes fairly slow, so the many pictures taken through the large windows should turn out well. The family is now anxious to get out of the bus and experience this portion of the Road - especially when they see Bird Woman Falls and the Weeping Wall - but the shuttle's next scheduled stop is not until Big Bend.

It has been over half an hour since the shuttle left Avalanche and the family is quick to get out at Big Bend. The crowds at Avalanche are nowhere in sight now, and the

views are incredible. They are somewhat disappointed that this is the only shuttle stop on the cliff-hanging portion of the road, and take advantage of every minute they have to enjoy the scenery from here until the next shuttle arrives a half-hour later. Martha hopes there is a lost-and-found department somewhere because Amy realizes she left her sunglasses on the last bus.

Less than ten minutes after leaving Big Bend the family arrives at Logan Pass. The entrance to the parking area is blocked off to cars because all of the parking spaces are full, but they are allowed in because they are on the shuttle. It is nearly a quarter past noon and the family sits on the wall overlooking the St. Mary valley to enjoy the view as they eat the lunches they have been carrying in their day packs. They are glad they planned ahead for lunch because, as the website had said, there is no place to buy lunch for many miles in either direction of Logan Pass. After lunch and another quick stop at the comfort station, they are anxious to stretch their legs. The Hanging Lake Overlook Trail seems perfect. It offers a chance to hike on an established trail, experience the treeless area of the park, and see some of the marvelous mountain scenery at their leisure. The hike to the overlook and back takes them two hours, but is well worth the effort. They even see some mountain goats up close along the way. Back at Logan Pass now, they go into the building and check out the displays. Soon the bus will be arriving so they can't stay long. Between the hike and lunch they have been here for two and a half hours and know they need to move on. At 2:45 p.m. they are back on the shuttle continuing east.

On the bus Martha reminds everyone that they have to make a return trip at the end of the day and they have a decision to make: Do they travel the whole length of the Road to St. Mary, or do they spend time at the several interesting stops along the way? They do not seem to have time to do both. They decide to see as much of the Road as possible, even if that means having to miss some of the stops along the way. The first stop they skip is Siyeh Bend. They do not want to miss the opportunity to see a glacier so they get off for a quick look and photo opportunity at Jackson Glacier Overlook, and manage to make it back on the same shuttle before it leaves.

Sunrift Gorge and Sun Point are also sacrificed for the schedule, but they decide they absolutely must get off and spend some time at Wild Goose Island Overlook. The pictures of this area that they have seen convince them that this, too, is a "can't miss" stop on the Road. It is a little before 3:30 p.m. when they arrive. A chance to relax and take photos of the beautiful scenery is appreciated at this point. When the next shuttle arrives, they are surprised at how quickly a half hour has passed.

From here they push on to the St. Mary Visitor Center, under 20 minutes by bus, where Martha helps Amy choose and purchase a book on glaciers. Due to the transit scheduling they have only 20 minutes at St. Mary before starting the return trip westbound. The bus leaves on time at 4:30 p.m.

Growing a little tired now, and realizing this will be their only opportunity for food for a very long time, they decide to get something to eat at Rising Sun. They have 30 minutes to eat something from the store before the next westbound shuttle arrives at about 5:15 p.m.

It is about two and a half hours by shuttle now back to the west end of the park, but there is still one place they want to stop. A little more than fifteen minutes after leaving Rising Sun they disembark at Baring Creek Bridge. Here they admire both the obvious workmanship of the bridge and the unique geologic feature at the gorge. The cool air from the gorge feels good after such a long day (fortunately the buses are air-conditioned and very comfortable).

Around 5:30 p.m. they get back on the bus for the last time. They stay on all the way through to the west end where it arrives at 8:10 p.m. The driver engages the family in conversation and shares with them many interesting things about Glacier's past and the Road rehabilitation project; he even points out a deer standing along the shore of McDonald Creek. Exhausted but excited at what they had seen and how well they made the transit system work for them, they finish their day a little more than twelve hours after they first stepped onto the bus. Now it's back to the hotel. Tomorrow they will drive around the southern boundary of the park on US 2 to stay at the Glacier Park Lodge. From there, day trips are planned to Two Medicine and Many Glacier.

The story of George, Martha, and Amy illustrates several important facts about how the shuttle system will impact visitor experience:

- Shorter headways (less than 30 minutes) would make stops easier and less time-consuming, but the shuttles cannot run on headways that the site stays would dictate, because demand (ridership) will not be high enough.
- Longer headways (more than 30 minutes) would further reduce visitor's time and flexibility.
- Riding the entire length of the Road and stopping for the basic visitor experience this family enjoyed requires a little more than 12 hours. This means that those starting out later than about 9:30 a.m. will have to choose between skipping even

more stops and activities than George and his family did, or not traveling the entire length of the Road.

- Transit riders will be spending a great deal of time on the transit vehicles, so vehicle comfort and scenery visibility must be made a priority.
- Drivers must be friendly and ready to provide information or a rolling tour to improve this portion of the visitor experience.
- The proposed shuttle stops cover only a limited portion of the visitor stops, pull-outs, waysides, etc. available to the visitor driving their own vehicle.
- George, Martha, and Amy were able to experience Going-to-the-Sun Road via transit; they went on to use their personal vehicle to visit other areas of the park. This provided a well-rounded visitor experience.
- Unavailability of parking will not affect those using the transit system.
- The transit center is the visitor's first exposure to the transit system and as such should be convenient, inviting, and provide an easy transition from personal car to transit vehicle.